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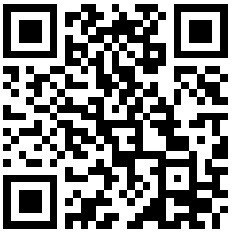

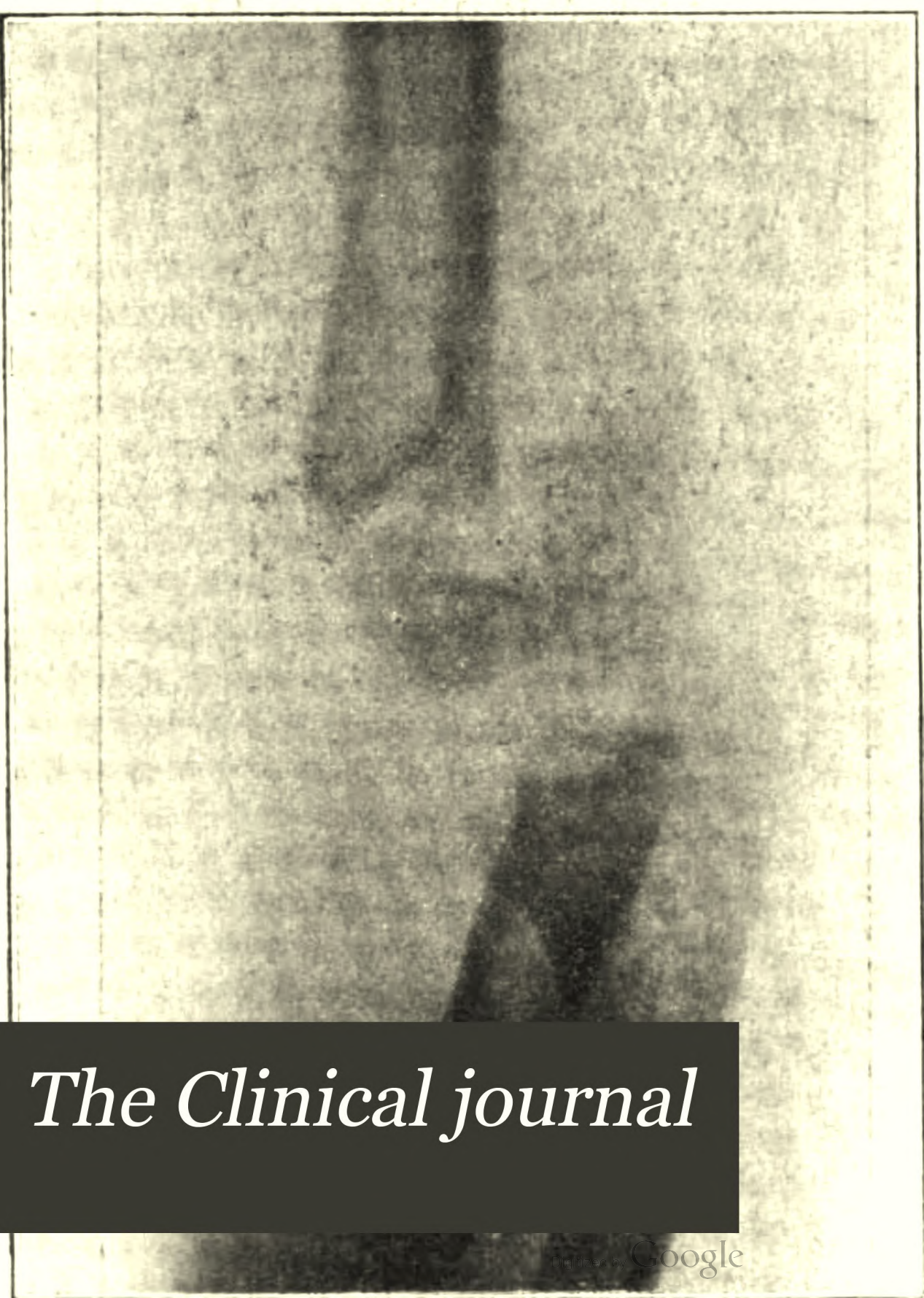

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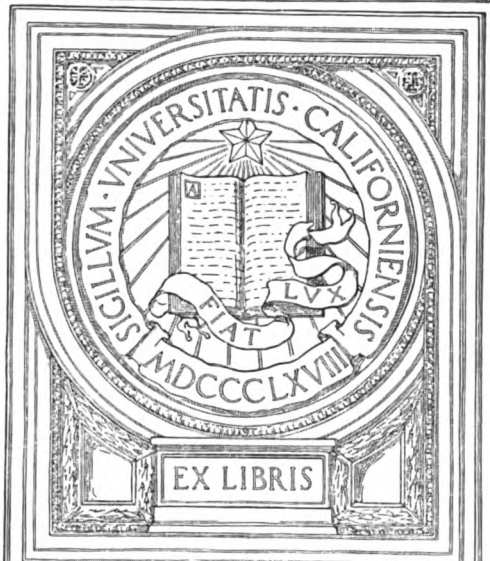

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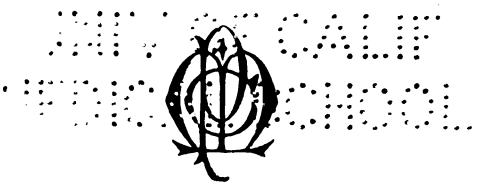

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A CLINICAL LECTURE

ON

DISEASES OF THE AORTA NOT DUE TO RHEUMATISM.

Delivered at the Medical Graduates' College and Polyclinic, Chenies Street, W.C., September 26th, 1900,

By A E. SANSOM, M.D., F.R.C.P.,

Physician to the London Hospital.

GENTLEMEN,—First of all I may say that I take it as a great compliment that I am asked to come and say a few words to you to-day upon a subject in which I will try to interest you. If there is any fault it will be my own. I will simply work with you; anything I have done I know you will believe has just been done with an eye to the progress of medical knowledge, and it is that I may ask you to join with me in a clinical conference rather than to listen to a clinical lecture that I am here to-day.

My title is "Some Diseases of the Aorta which are not due to Rheumatism." I have not brought any cases to illustrate this lecture; first of all, because you will have plenty of opportunities of observing one type of case, and perhaps many of you have already observed such cases; and secondly, because if I had examples of the second type they would not teach you anything. They can be studied only by closely looking at them over considerable periods, not only with my own eyes, but I hope in the future with all your eyes, because we have a great deal yet to learn about them. But I have not forgotten the paramount importance of these lectures being practical, as I think you will agree. There may be differences of opinion as to the meaning of the word "practical," but I will tell you what I mean by the word.

I want to picture to you a disease or diseases such as should be presented with the one idea of knowing as much as we can about them and of doing the best we possibly can for the patient who suffers. Now it is not practical to look at

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a condition of things from a therapeutic standpoint entirely. Unfortunately during my medical years, which have not been few, I have seen many "infallible" plans of treatment go up like a rocket and descend like the stick, and I think that is the experience of many of us. We hear of marvellous things, and of Somebody's Cures being the only methods to put people right. Sometimes they do much good and turn the scale of therapeutic possibilities. But it is not always so. Those things which live for a year or two do not live for more than a year or two, but the underlying truth of them does. Now just one word more of definition of "practical" under the present circumstances. This, I take it, is a clinical lecture, and I think I answered practically some time ago in one of my clinical lectures, the question, "How does a Clinical Lecture differ from a Systematic Lecture in Medicine?" A systematic medical lecture shows the elements of a disease as they would be presented on a chessboard. The lines are marked out, and there are mapped out very ably—you could not do without such a guide—the outlines of disease. This is most valuable. A clinical lecture gives you the *moving* picture. To my mind there is all the difference in the world between a static picture and a dynamic cinematogram. It is the moving picture we want, and that we get in the clinical lecture, the movements of disease in the individual who is suffering from it; then we deduce the best treatment.

Our topic, then, is "Some Diseases of the Aorta which are not due to Rheumatism." When I say "rheumatism" I mean the clinical picture of rheumatic disease affecting the valves of the heart, and I am now only speaking of the aortic valves. In a large number of cases rheumatism does affect the aortic valves, and it seldom does that except it affects the mitral too. It produces endocarditis. I am speaking of what I regard as true rheumatism, rheumatism which you know produces the form of endocarditis which we call rheumatic endocarditis. It affects the mitral valve; it involves sometimes the aortic valves, sometimes other valves. But, at any rate, in rheumatic disease you very rarely get the aortic valves involved without the mitral being implicated too. That is a definite picture which I shall not attempt to portray now, I mean rheumatic valvular disease affecting the aortic valves. Then there are other forms of disease which affect those valves but which have nothing whatever to do with rheumatism. Those diseases which affect the lining membrane of the aorta, and which are non-rheumatic, I am going to describe to you briefly in two types. The first type is the ordinary form, what is known as Atheroma—atheroma causing disease of the aortic valves.

Let us picture the patient who comes before us with type the first. We examine the patient, and find the usual physical signs of aortic obstruction and regurgitation. We find that there is physical evidence of disease of the valves. The left ventricle is dilated and hypertrophied; the murmurs are systolic and carried up to the aorta and often into the arteries of the neck. The diastolic murmur is more of the ordinary aspirating type, it is blowing, less loud than the systolic, very often carried down the sternum and to the left, and towards the left ventricle of the heart. I do not think we can differentiate by the murmurs alone between rheumatic disease of the valves and non-rheumatic disease of the valves. But the physical signs will help us a great deal, because in the truly rheumatic we get not only the mitral yielding, as in the other case, but actual mitral valve disease, so that the mitral valve disease and the aortic valve disease go together. The lesion is, in most cases, but not all, more extensive, and the consequence is the hypertrophy of the left ventricle is more decided, and so is the lesion of the aortic valves. Then how shall we differentiate them from the rheumatic disease of the valves, leaving the physical signs? There is the rheumatic habit in some cases, and the patient is generally more anæmic. You find croppings up of true rheumatism, and the patient is a younger individual. As a rule, in the atheromatous disease which I shall picture now the individual is at least middle-aged, and probably beyond it. In the case of rheumatic disease, it begins before middle age, probably quite early in manhood or womanhood. In the other case the patient is usually of a more advanced age, but not invariably, as we shall presently see. We interrogate our patient, to make sure as to the difference. Supposing we have found there are signs of

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obstructive and regurgitant disease, we ascertain what the previous history has been. In the case I am picturing now he will tell you that he has had no rheumatic antecedent whatever; never had rheumatism in early life, neither acute rheumatism or subacute rheumatism; he has not got rheumatic anæmia, and never has had. His family is not necessarily rheumatic, and he gives us another story altogether. Next we ask him how it began; and he says he does not know, but that it came on very gradually. Well, in the other case it occasionally does come on insidiously, but there is some rheumatic probability. In this case, for the sake of argument, I will say there is no rheumatic probability at all. Then we have to think of the circumstances under which this came. Now he will tell us perhaps, particularly if he is comparatively young, nearly middle-aged, that there has been sudden overstrain. We know from his occupation and from what he says that he has been doing some very heavy work. Or that may not have been the cause at all; he may tell us he has had gout, which began in the great toe, and subsequently extended to other joints. Sometimes we may be able to see the uratic deposit. He may never have had true rheumatism at all. Yet he may be considerably below middle age, and he has probably had syphilis. That is a very important antecedent.

Now I must pass from the outside to something that is a little more debatable. I will give you my own experience, though I do not say I must be right. I have seen it as what I regard as the direct sequence of malaria, but it is not a recent sequence. I have seen it in people who have had malaria again and again, both Australian and Indian, and who have lived in other ague districts; and I could not find any other factor which seemed to me likely to produce this aortic valvular disease; certainly there was no rheumatism. Some people, and among them those for whom I have the highest respect, do not agree with me about malaria as a cause. I think there is a reason for that. For example, Sir Joseph Fayrer, I think, has never seen it. Laveran, who has done so much on malaria, does not see the sequence, but Lancereaux does. Now I think Lancereaux and I have had experience in the later stages, whilst others have had experience in the earlier. I do not think malaria is the only cause. I am inclined to think that the causes may be multiple; for instance there may be malaria *plus* gout; I feel quite sure that gout may reinforce gout, or gout may reinforce malaria. Another factor which enters into the matter very much is what is known as arterio-sclerosis, usually with chronic renal disease and defective elimination consequent upon it. We know that atheroma is a very frequent concomitant of that defective elimination. I want you to differentiate in your minds between what I call arterio-sclerosis, the general disease, and atheroma, which is a local thickening. The two often go together it is true, but I want you to carefully differentiate the one from the other.

In this *First Type* there is a good deal more liability to pain and to distress than in the rheumatic cases. That is perhaps strange at first sight. You get the aortic symptoms most marked in dangerous rheumatic disease. But you do not get the pain and distress of angina pectoris so much as in the other type. This acute pain is more marked in the atheromatous form of disease, and in most cases there are variations and paroxysms. In other cases it is one steady progress down hill. Where there is no improvement there is perhaps a block of the coronary artery, and the downward course is impossible to stay. In the other class of cases there are intermittent anginal attacks, and they occur more in the degenerative or atheromatous form of disease that in the rheumatic. We must recollect that according to the best statistics the two forms are about equally prevalent; that is to say half are atheromatous and half are definitely rheumatic. Therefore you will see the differentiation between them becomes a matter of very great practical importance. As regards the general arterial system, you will recollect that the aortic degenerative disease, the atheromatous form, is accompanied by thickened arteries, whereas the other, occurring as it does in early life, is not so accompanied. Thus pulse observation and pulse tracings differ very much in the two classes of cases. In the one case there is typical sudden pulse without thickened arteries. In the other you get a less typical pulse, but the artery is firm between the beats, and its walls are thickened, and there is a broad plateau in the sphygmogram; whereas there is no broad plateau in the rheumatic, or

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at least very seldom. I am presenting the types to you very roughly now; we will come to the morbid anatomy by-and-by. This is a clinical type which is presented to you, which you can detect by examination, by inquiry of the patient himself.

But things are not so easy when we come to the second type, for it is much more obscure, and you may say, much more rare; it is also much more dangerous and difficult to differentiate. Your patient is probably middle-aged; it may be he is in the early middle age or in the late middle age. When you come to examine him physically you will find perhaps little or nothing amiss. You cannot find any abnormal heart signs, and yet the patient complains of great distress. Sometimes he has severe pain of angina pectoris type; perhaps the pain is not so severe as that but is paroxysmal, coming on sometimes after exertion, or even coming on at night; but at any rate accompanied by dyspnœa, and the patient disinclined for anything like exercises. Here also you have to ask about antecedents. You will first of all hear that there is nothing rheumatic in his history at all, that he has never had rheumatism. Of course I do not mean that there are not mixed cases, but I am now picturing a special case. Then you ask the patient what he has suffered from. You find he may have had some infective disease, such as scarlet fever or smallpox, but perhaps you cannot be sure about it. But there is one thing he may have had, which comes before us very much in these days, namely, Influenza. Now that imports a great deal of difficulty, although sometimes it clears our course. The difficulty is this: that pain at the heart and severe suffering referred to the heart by the patient is very common after influenza. I think that is the experience of all of us. In ninety-nine out of a hundred of these cases the patient gets well of this acute pain at the heart. I am perfectly certain that painful affections of the circulatory system with disturbance of rhythm of the heart and pain referred to the heart and neighbourhood coming on distinctly in relation with influenza, are in nine out every ten cases, if not in ninety-nine out of a hundred, due to nerve causes and not to heart causes. But unfortunately in the remaining one per cent. this pain is due to causes in or near the heart; we will call them aortic causes.

Now how are we to differentiate between the two? It is very difficult to do so. I would even say it is impossible without you have the case so that you can watch it carefully, frequently, and on many occasions. I have seen patients suffering the most intense pain,—who have been knocked down by the pain in a case of influenza. I described one case of a strong man having complete syncope from pain in such circumstances and yet made a complete recovery. I am perfectly certain that he had no rheumatic disease whatever. But, on the other hand, I have known cases suffering much less agony die, and I have witnessed the post-mortem evidence.

Can we differentiate the cases at all? I think we can. Of course we are speaking of affections of the aorta. When there is this post-influenzal affection of the aorta, organic in character, then there are usually paroxysms of pain of a distinctly anginal type; and if you watch the case you will see that there are times and seasons in which, if you keep your finger upon the pulse, you will find it will get narrow and firm. I do not say you can always use an instrument of precision to determine it. At that time there is præcordial distress and pain, the countenance is pallid, and, if the patient is up he is careful to rest; he keeps quite still, and seems anxious not to move. There is at first some slowing of the breathing, and then occurs a difficulty in breathing. I have seen the same cycle of events occur in bed. At these times the patient's countenance becomes leaden; he feels as if he were going to die, and eventually he dies. That is a very different picture from the one I spoke of first, where a chronic degeneration involved the aortic valves. And I must enforce what I have already said about malaria. I have seen the more acute symptoms which I speak of so distinctly in association with malaria that I cannot doubt the causal relation. I wrote on the subject in my article on "Diseases of the Blood-vessels" in the 'Twentieth Century in Medicine;' there you will find an amplified reasoning.

Now apart from causes, let me tell you that this becomes a very serious and important matter. There is organic disease affecting the aorta and producing certain effects which we will speak of in a moment, because we shall have a clearer

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conception from the morbid anatomy. Although there are great difficulties, I do not think you will find the differentiation impossible. There is the type of atheromatous disease affecting the aortic valves and producing symptoms of organic valve disease; there is the type in which you get no evidence of organic disease affecting valves, but you observe the distress of the patient. Now there comes something to help you sometimes in this second class, that is, there may be some very slight affection of the valves. In the course of examining one of these cases you will have great difficulty in determining whether the patient has that nervous, painful form of disorder which I have spoken of, and which is by far the more frequent, or whether it is the real organic endarteritic (endo-aortitis) form. I have several cases in my mind where there has been evidence of very slight diastolic murmur, not always heard. The sounds have been very well marked throughout, the aortic second sound has not been muffled, and has not been altered a bit in the previous examinations; but on a certain occasion one finds that there is a little whiff in diastole, and you find afterwards that there is a little puckering of the valve in a limited portion of it, so that it is drawn up and does not fit properly. But I take it that the most important part is the paroxysmal distinct angina, whether it is of the modified (vaso-motor) kind, or whether it is of the distinctly painful, violent kind. At any rate, that is *the* point. There is the physical distress without *necessarily* the heart pain.

Here are the two types of disease, which have for their cause a disease which many people lump together as atheroma. In the first class of cases this is unquestioned. I am not going to give a histological description of atheroma, or even a description of the valves as affected by atheroma other than just to illustrate what I want you to follow. Both these affections may be accompanied by signs which, at first sight, may tempt you to say there is nothing the matter with the heart, that there is only an atheromatous aorta. Now let us take the post-mortem in both types of cases. In the one case there are the usual signs; there is atheroma above the valves but nothing below them, patches of what you call atheromatous disease and the valves involved—thickened, fibrous, softened patches, with some enlargement of the lining membrane and some bulging of it. In many cases there may be calcareous change, so that the valves are partly fibrous and partly calcareous; the plates above are sometimes soft and swollen, and sometimes thick and infiltrated with calcareous material; sometimes thick and furred. That occurs above the valves. It is far different from the rheumatic morbid process, which stretches up the great curtain of the mitral and involves the valves from below, while the other disease involves them from above.

Now what about the second class of cases, those which we have spoken of as being subtle and obscure? You look above the valves and say, "That is an early atheroma." In some cases, you will see some old atheroma and some new atheroma, and if you look carefully you will see that the patches are in different stages, different epochs, like an eruption above the aortic valves. It may be limited. Then you say, as has happened to me in a case almost acute, "Well, sir, there are no changes in the heart, there is only atheroma." "*Only* atheroma! Let me look at it." What do I see? These patches are always paler than the lining membrane, sometimes they are also a little gelatinous, what the French call *plaques gélatiniformes*. By the side of them you will see something older showing the same thing. You could not differentiate it from the calcareous infiltration of atheroma and fibrous thickening, and in some cases the fibrous thickening has puckered up the curtain of the valve somewhat. What are you to understand by this? There are microscopical preparations on the table for you to inspect, but I have brought a few drawings which show some of the early stages. How is this microscopical change brought about? It is really a very important matter for treatment as well as for investigation. Is there this association between the two that I have been speaking of? Are we to reconcile the atheroma which occurs in a chronic way with that which occurs in an acute way? Can we differentiate them? Yes, I think we can, and that it is our duty to do so. How does this atheroma begin? You find that the lining membrane of the aorta is raised, but it is perfectly smooth. Does that occur in all the cases? Yes, whether they are chronic or acute. You ask, "Will the whole course of the

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atheromatous change occur under a smooth endothelium?" Yes. I have many a time taken up an aorta and felt the membranes smooth and polished and yet have cracked the atheromatous plates underneath. Let us think how it is formed. Let us take the factors in the more chronic form, and first of all that which is clearly associated with overstrain. I agree with everybody that overstrain is a cause of atheromatous disease. How does the overstrain operate? Where is the overstrain? Those are very important points for us to thoroughly face. Is it within the aorta itself? Surely no. If it were in the aorta itself what would be the first thing to give way? The internal coat; you would not have that perfectly smooth lining membrane covering it. There is no lesion of the innermost layers of the inner coat. The endothelial lining is not affected except in what is called an atheromatous ulcer, where it is suffering from pressure, and where the calcareous material is obvious to scratching with the finger. But for each one like that you will find many in which the lining membrane is smooth and there are no superficial changes at all. I am convinced that the overstrain in the aorta is a cause, but *it is not inside* the aorta. Where is it? It is in the arteries supplying the aorta, in the vasa vasorum, the arteriæ arteriorum. These vessels are subjected to intense strain, and they give way at their terminals, and so the mischief is just where these terminate; that is to say in the middle coat and the adjoining fibres of the internal coat. This you can prove by sectioning them. The original observation on that point was made by a Frenchman, Hyppolyte Martin, and you will find it is very important. The strain is not inside the aorta; you would have rupturing of the aorta if it were, and assuredly you do not get that. Nor is it in the middle coat only, it is in the deeper fibres of the inner coat.

Let us look over those pictures which embody what I have done in the matter and what I have borrowed from other people with whose observations I am entirely in accord. In the case of overstrain I take it that the initial is the rupture of the arterioles or of the capillaries in association with the arterioles in the deeper layer of the inner coat, allowing the exudation corpuscles to get into the layer nearer the lumen but not to the extreme surface. But there is something which happens to the surface, and it is seen to bulge. Why? I have a large number of sections, and I find the fibres are spread out and divided one from the other much more than they are in health; there is an open meshwork quite enough to account for the bulging. That is œdema, they are separated by fluid. That is what occurs, whether in the aorta or in the coronary artery, forming a bulging which in the coronary obstructs the flow of blood through, even before there is any more degenerative change in the exuded material. That is how it occurs, according to my belief in overstrain.

What about gout? First of all, the atheroma is not universal, it is not spread throughout, but it is in patches. In gout we know very well about the solid urates; is not it likely that some solid urate, some insoluble urate, is projected into these arterioles? I think so, and I have many reasons for thinking so. But there is some other process going on; the effused leucocytes or round cells go into the fibrous tissue and there is fibrous proliferation. There are many specimens here for your inspection which will show you what I mean. I hope you will examine for these calcareous degenerative changes underneath the sound endothelium, which is a very important point. You may say when you have cases like this, "Oh, this is only ordinary atheroma;" but I ask you to say whether there is an acute endarteritis or a subacute form. I do not want to put too fine distinctions upon it, but I believe most fully that the beginning of it, whatever it is, is underneath the lining membrane and not in it. When you come to syphilis as a cause, of course that is easy enough to realise. There is a syphilitic endarteritis and that occurs in the terminal vessels supplying the aortic wall.

When we come to the acuter forms, post-influenzal, we find signs that the morbid changes occur in patches; they produce symptoms which are severe and acute, something like those of ulcerative endocarditis.

You will remember I have said that there may be and sometimes are complex causes. You may ask what has all this to do with treatment? I think we shall have done a very great deal by differentiating these cases. We are now able to form a picture of the onset—gradual in one case and more sudden in the other—and you do not

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say to yourself, "Oh, the diagnosis is aortic valve disease." That is not a diagnosis in itself, it is only a step towards it. You have to think of the difference in treatment of the two cases, and the varying condition of the patient under various circumstances. In the one case there is a rheumatic failing valve, and you have to keep up the force of the ventricle and of the individual, and do away with the tendency to rheumatism and to rheumatic anæmia; whereas in the other case you have to think of the different state of affairs, a degenerative process, beginning, continuing, and, unless arrested, killing the patient. Suppose you say we will treat them both alike. This heart is failing, give something to pick it up; caffein, digitalis, strophanthus—all heart tonics. If you do that you will do more harm than good. You are causing the heart to pump away and increasing the tension, whereas it is craving for a freer outflow. Now in the case I am speaking of, whether it is chronic or whether it is acute, let the doors of the circulation be wide open. I do not say never give digitalis, but always give something which will unlock the arterioles with it, such as nitro-glycerine or iodides. I think the iodides are safest with them. Arsenic will agree and iron will not. Anything which increases the high tension within the arterial system in a case of degenerative disease does more harm than good. Nutritive things will do good; cod-liver oil will sometimes do good where iron will do harm, and digitalis must be used with the greatest caution. If you increase the tension you may do much mischief. If you give digitalis at all, always give something which will relax the arteries. Diet is a very important point, and the nearer it comes to milk and the further it goes from alcohol the better. If you do give alcohol, give it with plenty of milk food. Brandy and water and whiskey and water in anything like considerable quantity do not agree, because it is so hard to get them eliminated; they irritate the kidney and increase the tendency to sclerosis. Milk with them, however, acts as a diuretic and enables the patient to get rid of the toxic substances more easily. I do not say we are not entitled to have a difference of opinion about that, but I do say that milk food is the best thing. I always say that white milk makes good red blood. And then there should be exercises, and, I need not say, baths, and so on. If you see any signs of acute progress of the disease, rest the patient absolutely and be most careful of your treatment. Afterwards, if you believe there is a quiescence, do a little graduated exercise, which is better than no exercise; free play of the lungs is better than no play of the lungs; some little training is better than coddling, and all our efforts should be to go in the paths of physiological righteousness.

SURGERY does little for the imbecile. Some years ago a considerable number of operations of craniectomy were made, confined altogether, or nearly altogether, to cases of microcephaly. By removing portions of the skull it was hoped to allow a renewal of the growth of the brain, which was supposed to have been suspended by pressure. With the result of such operations you are doubtless familiar. There were some fatalities, which were perhaps not to be so much regretted in the class of children in which they occurred. There was so little actual benefit which could be ascribed to the operation that I do not think that you will find many surgeons who to-day will advocate the measure. Post-mortem examinations do not sustain the theory on which the operation is based. There are, however, sources of peripheral irritation which cannot but be mischievous to a weak nervous system, and such causes should be removed as fast as discovered. Persistent eye strain may be mentioned as one of these. I have seen very decided improvement following the wearing of glasses in such cases; improvement which was almost immediate. Abnormal growths in the nostrils or throat, phimosis, deformity of the feet, should be remedied when possible. Operations in all these cases furnish hope for improvement in a class where we are justified in seizing every opportunity for bettering their condition. The orthopedic surgeon may do much for them by adding at least to their comfort and self-helpfulness. As a rule they stand operation well. It is hardly necessary to refer to the importance of absolute asepsis in this class, whose powers of resistance are so feeble.—Dr. WILMARTH, *Pediatrics*, October, 1900.

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WITH MR. LOCKWOOD AT ST. BARTHOLOMEW'S HOSPITAL.

GENTLEMEN,—This big healthy man comes complaining of his testicle. You see he has a swelling in the left side of his scrotum, where there are some prominent veins noticeable; so thus we have the opportunity of going through part of the routine of the examination of a scrotal swelling. Before touching it you notice that the ordinary scrotal wrinkles are there, that the skin is not red, or smooth, or shiny, nor is it much stretched. You notice also that the swelling is oval in shape, with the long axis at right angles to the axis of his body. Another point which strikes one on simply looking at it is that there is the usual constriction at the upper part of the scrotum, or, as I usually say, at the neck of the scrotum, from which I infer that the swelling below does not extend far upwards, and that at all events it is not a swelling which comes down from above. Now what do you infer from the fact, that it is an oval swelling with the long axis lying across the body? That it is almost certain not to be fluid in the tunica vaginalis, because collections of fluid in the tunica vaginalis take the shape of a pear, sometimes even omentum distending the tunica vaginalis shows that tendency to become pear-shaped. Why? If you look at specimens of hydroceles you will find that there are fibrous transverse bands in the wall of the tunica vaginalis about on a level with the top of the epididymis, so that at that point it does not distend, but below that there is distension, which gives the swelling the peculiar pear shape. In this man the swelling is not pear-shaped, which suggests at once that the swelling is not fluid in the tunica vaginalis, but in all probability some solid in the lower part of the scrotum. Our next proper step is to take hold of the healthy side and feel the spermatic cord and slip that through the fingers, and then you will feel the vas, and perhaps the arteries, nerves, lymphatics, and veins. This is done in order to get the standard of comparison. We can feel these separately, and therefore we may assume that the cord is not œdematous, that is to say, that there is no inflammatory material in the cord concealing matters, that there is no hernial protrusion of any kind, that there is no malignant growth going out from the testicle to obscure the veins and arteries and cord. Now on the left side the veins feel fuller and I cannot distinguish the arteries properly. Pain is not excited by the examination. Now we come to the swelling itself. I feel whether it is solid or whether it is fluid, and what sort of surface it has. Scrotal swellings are difficult to diagnose, and people do not go carefully enough over them. If we fail to satisfy ourselves as to what the swelling really is by ordinary methods we shall have to use a light. Sometimes people use the light in a silly way. A little electric lamp is the proper light to use, and then one can see all sorts of things which are not apparent to one who uses an ordinary candle or even a wax match. This man's epididymis is very much enlarged, so also is the testis; the cord likewise is a little swollen. We have a very hard swelling, solid, and very heavy. Now there is something odd about the swelling. You must try to discriminate between the body of the testicle and the epididymis, that tells you a good deal. There is no doubt here that the body of the testis is below and the swelling above it. Here therefore we have a swollen, hard epididymis, with a little œdema of the cord, with a little tenderness, whereby I should guess that it is inflammatory. The condition is not likely to be tuberculous, the appearance of the man is against that, moreover the feature of the tuberculous process is hard caseating masses, which afterwards soften. This man's swelling is more doughy than elastic and nodular; also, we cannot feel any tubercle of the vesicula seminalis *per rectum*. The man says he has had the condition nine days, and does not remember having had a blow on the scrotum. If he had tubercle in his testicle the probability would be that he had it elsewhere, and he does not look like a man of that kind. He is married and has three children, and denies any syphilitic taint. I therefore regard the case as one of chronic epididymitis, and I think under iodide of potassium he will get better. I should be disinclined to think it is syphilitic, because it would be syphilitic disease of the epididymis alone which would be quite out of my ideas, as I never saw such a thing. Syphilitic disease of the testicle would result in his having a hard testicle like a cricket-

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ball, affecting the body of the testicle rather than the epididymis. In the latter stages he might have a gumma, and that begins in the body of the testis. I shall order a suspender for his testicle. He says he passes his water comfortably. I asked that because people with strictures are very apt to get epididymitis.

The man now before us is a cooper, and comes to us with contraction of his palmar fascia. He is able to do his work. He also has a swelling on the sternum, which I take to be true keloid. There is a false keloid, which comes from burns and so on. These true keloids are usually irregular in outline and like a tomato. The man says it is getting bigger. It is difficult to know whether to remove these keloids or not. If you remove them the scar of the wound is apt to become a keloid, and on the other hand, sometimes, if they are left alone they shrivel up and disappear. Or they may go on for a number of years without altering, and nothing further seems to eventuate—they do not ulcerate or bleed, or threaten the person's life. As to his hands, if it interferes with his work, he will do well to have it rectified; but it is a matter for him to decide. But if the operation is done for him, it will require a certain amount of trouble to keep it straight. Many such cases after the operation take no further trouble, and consequently, a good deal of the contracture returns. We should treat the contracture by multiple subcutaneous puncture. Some people make an incision and dissect the band of fascia clean out, but I think multiple puncture would be the best. Before this operation a rich man would go to an instrument-maker for a splint, and pay £10 or £15 for it. It would be an instrument like a gauntlet or crusader's glove, so that each joint could be manipulated with a key. The patient decides to have both the keloid removed and the palmar fascia divided.

Here is another case which I want you to diagnose with me. Let us proceed step by step and see what we can learn with our eyes. The patient is a girl aged about eleven. The first thing we notice about her is that she holds her head very stiffly, and that it is rotated towards the left. When we ask her to recline on the pillow for greater comfort she still holds her neck and head in the same way. When we ask her to rise from the pillow she first of all puts her hand to her head as if to give it support, and sits up with extreme care. The first observation one would make so far is, that apparently there is no hysterical condition of the spine. If there had been, she would probably have moved her head to look at me when I asked her to sit up. The enlisting of the hand to support her head may indicate pain on movement, as well as a feeling of insecurity. In a case of odontoid disease the patient lies in bed very still, with the head quite fixed. If you tell such a patient to get up, the first thing he does is to very carefully take hold of his head with both hands, then stagger on to his knees, and finally to his feet. I once saw such a case in which the head was forcibly rotated by one who had not grasped the significance of these signs. Just think of rotating the head when the odontoid process is on the point of giving way.

Well, the next thing we notice about this patient is that there is a swelling at the back of the neck, which we must proceed to investigate. You will notice we cannot define the limits of it, as it fades into the surrounding parts. Certainly it reaches almost as high as the occipital bone, and down at least as far as the sixth cervical vertebra. Sideways it extends from the hinder edge of the left sterno-mastoid to the outer edge of the right trapezius muscle. The most prominent part of the swelling is to the left of the second cervical vertebra. There is slight redness and œdema of the skin, but it is not shiny or inflamed. We next want to find out whether the swelling is painful. It is necessary to go carefully to work to ascertain this, and I advise you to always feel the opposite side first. That is to say, if the swelling is near the elbow, feel the other elbow first; if the knee is the seat of trouble, feel the other knee first. The object of this is twofold. First, the sound side affords a standard of comparison with the affected side; and secondly, confidence is instilled into the mind of the patient. His reflection will be, "He is handling me very tenderly and is evidently sympathetic and careful; I can trust him to feel the painful part, for if he hurts me I know it will be because he cannot help it, and not because he is clumsy or callous." In addition it is wise to begin to feel at the edge of the swelling, because this is probably its least painful part. This particular swelling is not pain-

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ful. The next point we elicit when we come to touch it is that it is a very hard swelling. Now a swelling may be hard because it is solid, or because it consists of fluid inside a thick capsule, or beneath deep fascia. Now will some one ascertain whether it fluctuates? In ascertaining fluctuation it is very important to test for it in the direction of the long axis of the body. If you test for it cross-wise, a muscle is very likely to give you an impression of fluctuation; and you can test this on your own thigh, it will fluctuate across, not longitudinally. We cannot detect fluctuation in this swelling. It is fixed to the spine, and the skin is movable over it. I ask her to raise her arm, and you see that the trapezius moves over the lower part but not perceptibly over the upper part. Now if you put one finger on your own fifth vertebra, and another on the sixth, and another on the seventh, and then bend your head down, you will notice that the spines separate during the movement and there is no pain. Now if you do the same thing with this patient, the cervical vertebræ move together, and the fifth and sixth are like a solid mass, but there is slight movement between the sixth and the seventh. Last week I pointed out to you, in the case of an inflamed knee-joint, that an inflamed joint ceases to function, that is to say, ceases to move properly. We conclude from the facts we have obtained so far that the third, fourth, and fifth vertebræ are locked by inflammation in the same way that an inflamed knee-joint becomes locked. I will now ask you to proceed a step further. Are her atlas and axis intact? If they are intact she may be able to nod her head. I think she has movement at the base of the skull, so that the occipito-atloid joints are probably intact. She cannot, however, rotate, so the atlo-axoid are probably involved. I want you to get into the habit of applying the anatomical facts you have learnt elsewhere, and not to think of a spine without thinking whether it moves or not, and if it moves, which part of it does. If we want to get as near as possible to seeing the atlas and axis of a patient we look down the throat; if she has disease of her atlas there may be a swelling bulging in the pharynx. There is no bulging there. What is this swelling then? You say it is a chronic inflammatory swelling connected with the left side of the spine, locking it. What is its nature? Now you ought to have begun by examining the patient all over, and you will perhaps have noticed already, or you ought to have done, that she has scars on her arm which are deep, and have a good deal of granulation tissue about them. They look like healed sinuses, showing that there has been suppuration. If you were shown this particular scar apart from the rest I am sure you would diagnose lupus, a tuberculous disease of the skin.

We now know what sort of swelling this is, and as she has evidence of old tubercle elsewhere we conclude that this must be a tuberculous lump. The next thing necessary is to form a clear picture in our minds as to the kind of disease this is. The sequence of events in tubercle is always the same, in whatever part of the body it occurs. The tubercle bacillus is carried to a part of the body, where it causes inflammation; then the inflammatory products caseate. If a piece of tissue were taken out of an inflamed knee-joint such as that which we examined last week, you would decide whether it was tuberculous or not by the presence or absence of caseous material. Caseous nodules feel exceedingly hard. This swelling is very hard, and I should imagine that the inflammatory products are caseating. If they are kept very still the next stage may be calcification, and in this case the neck will become rigid and quite immobile. How often do we see men walking about with old angular curvature of the spine, but who, because they have got a buttress of bone in and around the angle are able to carry heavy weights. But tuberculous tissues do not always pursue such a favourable course. If left alone this may soften and form a tuberculous abscess. Such an abscess, if it occur in the psoas muscle, is called a psoas abscess, if behind the pharynx a pharyngeal abscess, and so on. If this swelling becomes a tuberculous abscess you would probably have to open it. If you did not open it what would happen? It would come to the surface, and the skin would ulcerate, and septic infection would ensue, so that the tuberculous caries of the spine would be aggravated by sepsis. That must never be allowed to occur. The wisest thing is to open the abscess and wash it out, getting rid of as much tuberculous material as you can, and then close it up again.

The treatment in this case at this stage is quite

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clear. She will be taken in, put on a flat bed on a firm hair mattress, and have a sand-bag put round her head. In a little while she will be provided with an apparatus, and when she is able to move without experiencing pain, she will be allowed to walk about.

The prognosis is that she will have a stiff neck, but in other respects she will recover. My reason for saying so is that she has shown she can resist and recover from tubercle elsewhere, and the presumption is that she will be able to resist this.

Here is another girl, very much younger, who holds her head stiffly, and has a superficial resemblance to the last case. But she is able to flex, extend, and rotate her head, so that there is nothing the matter with her spine. It is true she moves her head with great care. Limitation of movement towards the right is greater than limitation towards the left. Her right shoulder is higher than the left. Her right sterno-mastoid and trapezius are in a state of contraction, and one of the likeliest things to cause that contraction is pain. I ask you to feel gently along the course of the trapezius and the sterno-mastoid to see if you can detect a swelling in any part of it. None is evident. Now the nerve which supplies those parts is the spinal accessory, and there may possibly be something wrong with that. You know that if there is anything wrong it must be high up, that is to say, before the nerve supplies the sterno-mastoid. We do find a tender swelling in the region beneath the upper part of the sterno-mastoid. A little hard round and exquisitely painful lump can be felt there. On looking into her mouth we see she has tonsillitis, and her temperature is said to be 102° F. She has also ear trouble. My belief is that the origin of the trouble is septic disease of the ear. She has an inflamed lymphatic gland, and I think the spinal accessory is involved by being in close proximity to that gland. She will be given an aperient, with hot fomentation on her neck, under which she will soon improve.

You may observe, gentlemen, that in diagnosing these cases we have asked no questions, but have relied entirely upon observation and upon inferences drawn from the observations. In other words we have been trying to see and think.

CLINICAL LECTURES

ON

THE VARIOUS FORMS OF INTRA-ABDOMINAL SUPPURATION.

Delivered at Westminster Hospital,

By A. H. TUBBY, M.S., F.R.C.S.,

Surgeon to the Hospital.

LECTURE II.

GENTLEMEN,—At the previous lecture the various diseased conditions which are met with in the appendix were spoken of, and then I passed on to describe the several changes which might be met with in the peritoneum, and I made the statement that, "there can be no appendicitis without a certain amount of concurrent peritonitis." In every case of appendicitis there must be some degree of peritonitis with it, varying of course considerably in extent and in virulence, for the appendix is an intra-peritoneal structure. The peritoneum may be affected in different degrees: for instance, there may be adhesive peritonitis, that is to say, simply a pouring out or exudation of plasma which does not break down into pus; or pus may form in the effusion. You thus have a localised abscess which is known ordinarily as a perityphlitic abscess. Or the onset of peritonitis being quite localised, it may spread and become a general inflammation of the whole peritoneal cavity. Indeed, it is not possible in actual clinical experience always to mark off, as it were, a boundary line between adhesive, localised, and general peritonitis, because you will find in some cases the disease begins in adhesive peritonitis, goes on to localised abscess, and such a localised abscess may burst into the general peritoneal cavity; and so there ensues a general peritonitis. The question is, what is the exciting cause of peritonitis? Undoubtedly the prime cause is the action of certain bacteria, and the bacterium which is most active is the *Bacillus coli communis*. In all appendicular abscesses and in appendicular peritonitis you find this bacillus present in the effusion. It is astonishing the great virulence this bacterium acquires. It has been found in the secondary abscesses of the liver

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which follow appendicitis; it has been found also, I believe, in abscess of the brain secondary to suppuration in the abdominal cavity. With regard to the life-history of this particular bacillus: In health the intestine is full of this organism, and it has the power, under certain conditions, of changing its nature, that is to say, from a comparatively mild and beneficent bacillus in health, it becomes an intensely virulent pus-forming and suppuration-producing bacillus, as in the case of a diseased appendix. What actually causes the bacillus to change its rôle we do not know precisely, but it certainly does so, and undergoes most virulent changes. With regard to the adhesive peritonitis, which I have mentioned, you generally find the organism associated with every catarrhal form, and even in the solid exudation of appendicitis it has been possible to show, by proper staining methods, the presence of this particular bacillus. Adhesive peritonitis is a matter of importance, because you will understand that if the amount of exudation is very large, the coils of intestine may be bound down in such a way that they become kinked, and then follow signs of intestinal obstruction. A perityphlitic abscess generally results from a more serious condition of the appendix than adhesive peritonitis. You find with a circumscribed abscess that there are distinct ulcers of the appendix, either with or without a perforation. The abscess may be found in various places, in the right iliac fossa, in the pelvis, round the kidney, underneath the liver, or, as I have said before, on the left side, under certain curious anatomical conditions. These conditions are as follows:—The patient has a large appendix which turns towards the left side and runs across the spine; its tip becomes perforated on the left side of the median line, so that there is a left-sided appendicitis. Still, as a rule, appendicitis begins on the right side. The abscess varies very much in size; it may contain a drachm of pus, or two or three quarts. It may be, as in the case in Henry Hoare Ward, localised to the right iliac fossa, or it may extend right away to the umbilicus or beyond it. The shape of the exudation or abscess may be either round, triangular, or oval. When pus once forms there is always a very dangerous element introduced into the case, namely, the possibility of a patient having pylephlebitis, or a septic inflammation of the veins of the liver.

With regard to the contents of the abscess, they consist of pus mixed up with a certain amount of fæcal matter, and showing ample evidence of the presence of the *Bacillus coli communis*. General peritonitis may be either primary or secondary. In the primary form of peritonitis the appendix suddenly sloughs and gives way, and the foul contents are diffused through the whole peritoneal cavity. This is often fatal. The secondary form of peritonitis is that in which a localised perityphlitic abscess situated in the right iliac fossa bursts into the general peritoneal cavity, and secondary infection of the peritoneum takes place.

There is one form of general peritonitis which I must allude to, namely, the most virulent form, a dry peritonitis, in which you find next to no effusion into the peritoneal cavity. Some writers say that this is always fatal.

Touching upon the affections of the appendix, I might allude to actinomycosis and new growths. Actinomycosis has been recorded by Mr. Makins, and it is interesting surgically, but I do not think it need receive our very serious consideration in this course.

The appendix is often the site of new growths, commonly carcinoma, and certainly these new growths are occasionally mistaken for appendicitis, for sometimes suppuration occurs with them.

Regarding the *bacteriology* of appendicitis, undoubtedly the main cause is the *Bacillus coli communis*. In health, and as long as the intestinal tract remains absolutely intact, the bacillus appears to be harmless, but if for any reason the wall of any part of the intestinal tract becomes diseased, that is to say, loses its full vitality, then there is a distinct change in bacterial action. The bacillus is at once absorbed, and being absorbed into the tissues it sets up acute septic changes, and this absorption is not only into the intestinal wall but into the peritoneal cavity. The bacillus, as I have previously said, may be found in the pleural cavity, setting up there empyema, or in an abscess of the brain, and it is not uncommonly found in pyæmic disease of the liver arising from appendicitis. It is not the only micro-organism present, for you may find

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also the streptococcus and staphylococcus, and, strangely enough, the diplococci of pneumonia.

We will now leave the pathological side of appendicitis and pass on to the clinical. First, with regard to *ætiology*. It is essentially a disease of young life. I took an opportunity to abstract notes of fifty cases which occurred in the wards of Westminster Hospital, and I found that 8 occurred under ten years of age, 24 between ten and twenty, 11 between twenty and thirty, 3 between thirty and forty, 1 between forty and fifty, 3 between fifty and sixty. The explanation of this is that in young life the secretive activity of the intestine is greater, and its absorptive activity is more, and the lymphatic tissue is very much larger in quantity. Appendicitis is a disease which is four times more common in the male than in the female. I think the explanation of that is that males on account of their hurried conditions of life, eat more rapidly, and often more heartily than females. There is also a difference in the arterial supply in the male as compared with the female. In the male the appendix has only one vessel, but in the female two, the one being the vessel of the mesentery of the appendix, and the second derived from the ovarian artery. And it follows that the greater the blood-supply the less the likelihood of ulceration and of gangrene. In the next place, there is no doubt that appendicitis is distinctly hereditary. One has often wondered why it is, and I think perhaps the explanation is that the retention of fæces, or the entrance of foreign bodies into the appendix, depends very largely upon the size of the aperture by which the appendix communicates with the intestinal canal, and this is an hereditary peculiarity.

The disease is more common in the summer than in the winter or at any other time, and the cause is that people eat in the summer indigestible food, such as lobster, salads, salmon, and on that account are very liable to intestinal fermentation.

A very interesting feature in connection with the ætiology of appendicitis is the question of injury. You frequently find the patient says he was quite well until he received a blow on the lower part of the abdomen, on the right side, and within a very short time of that his trouble in the appendix came on. The reason is that the patient probably had a cystic or catarrhal appendix which gave rise to no symptoms until he had a blow on it, which caused acute inflammation, resulting in an attack of appendicitis.

Next with regard to foreign bodies. When I was a student we were told that all cases of appendicitis arose from the presence of foreign bodies. That is not true. The usual form of foreign body present is a false one, namely, a fæcal concretion. It is comparatively rare to find a true foreign body, such as a pin, a cherry stone, or a plum stone, and in a large proportion of cases a fæcal concretion is a cause of the appendicitis. They become very hard. Dr. Hawkins, of St. Thomas's, notes a case in which the stone was so hard that when it was thrown on the floor of the post-mortem room it bounded up like a marble. There is no doubt that early observers mistook these hard masses for cherry stones or what not, because fæcal concretions assume various shapes: they are described as being oat-shaped, marble-shaped, cherrystone-shaped, and so on.

The condition of the appendix is, to a degree, what we make it, and depends on the way in which we treat our digestive tract. People who are gross eaters and hasty feeders, who care nothing for their digestion, are more liable to appendicitis than others. It is very important to examine the teeth. If a patient is unable to masticate his food properly it stands to reason his food sets up fermentative peristalsis, accompanied by alternating diarrhœa, and constipation later on, and so he is very liable to attacks of appendicitis. Bearing on the question of the condition of the digestive apparatus, it is said that the Americans are very rapid eaters, and the men indulge in all manner of subtle liquors, and the women in ices and pea-nuts. Appendicitis is very prevalent indeed in America; so much so that I once saw an American lady who had come over here and she said, "Doctor, I have a habit of appendicitis." It was evident she knew something about appendicitis, and Americans suffer from it greatly. Much of the good work that has been done on the subject is by medical men on the other side. Appendicitis is very prone to occur in commercial travellers and medical men, because the condi-

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tions of their life are such that their food is often hastily eaten, and it is often uneven in quantity and quality. There are certain articles of diet which anybody who suffers from appendicitis should avoid with the utmost care, such as lobster, shrimps, and other savoury but indigestible foods.

The *symptoms* are either premonitory or actual, and we will first of all take the premonitory. A patient who has had one, or two, or three, attacks knows when he is going to have the next attack; there is a sense of general malaise; he has colicky pains in his abdomen, with either constipation for two or three days, or a loose foul-smelling diarrhœa; he has flatulence of a fœtid character, and often voids foul-smelling motions. What is the cause of that disturbance? It is that for some reason or another the absorptive and secretive intestinal powers have become perverted, and he excretes from the intestine a certain amount of foul gas. Those people can generally tell, even if they are apparently in health, when the next attack of appendicitis is coming on.

As to the onset, it is curious in point of time. A patient goes to bed overnight, having eaten a hearty and indigestible meal, and is apparently well when he retires. In the morning, about four o'clock, he wakes up and rouses everybody about him, and they find him doubled up with intense pain, and he is often seen to be collapsed. He refers his pain, not to the appendicular region, but to the whole abdomen, and he says the pain is so bad he cannot describe exactly where it is. I wish to emphasise the fact that in primary cases, and in many recurrent attacks, the hour has been noticed with great regularity. The character of the pain is severe, so much so that the patient may be collapsed, and it is such that it is mistaken for biliary or renal colic. At first the situation is general, but about the second day the pain becomes localised. The question is, what is the cause of the acute pain and collapse? It is probably due to an implication of certain filaments of the mesenteric plexus in the neighbourhood of the appendix. Some cases, after two or three days, are accompanied by painful micturition, and then you may take it almost certainly that the appendix hangs down into the pelvis, and that the lower part of the ureter and bladder are involved in the appendicular inflammation. The pain is aggravated by purgatives, and there is no doubt that many patients with appendicitis have lost their lives through the untimely administration of purgatives. In fact, one knows of some cases which would certainly have run a benign course if purgatives had not been given, for their administration has led to suppuration, and in many cases to acute and fatal peritonitis. You may ask how can you distinguish between the early stages of what I may call a grievous lesion of the appendix and colic? Well, colic is almost always relieved by pressure, but the pain of appendicitis is aggravated by pressure. Therefore if you have to deal with an acute pain which is increased by pressure, do not give purgatives. Under certain circumstances the pain may disappear temporarily, but only to return, so that you must naturally adopt a waiting attitude.

Another symptom, and one of the earliest, is vomiting. In many patients the sudden pain is accompanied by vomiting. This is more especially the case in children, and it is interesting to note the course that the vomiting takes. If the vomiting be persistent for two or three days, you may begin to suspect very strongly that you are dealing with a very serious case in which pus will form, or acute general peritonitis has occurred. If the vomiting becomes stercoraceous or very offensive, it is certainly a case of acute peritonitis, and should be operated upon at once. Vomiting is less in a recurrent attack than in a primary attack.

Constipation is usually present from the first, and it is undoubtedly due to paralysis of the cæcum and of the large intestine. If there be acute inflammation of any portion of the intestine you will always find that from that point a certain amount of paralysis of the bowel radiates and so constipation sets in. If the constipation remain persistent over three days or more, you are dealing with a form of intestinal obstruction, which I shall speak of presently. Although constipation is the usual rule, occasionally diarrhœa is present instead. When there is persistent vomiting with diarrhœa, it generally means that a general peritonitis is imminent, or that an appendicular abscess has formed early and very rapidly. The temperature rises quickly to 104° or thereabouts, and remains so for three or four days, and then may subside. I hope you will bear in mind very

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carefully what I am going to tell you next: in a case of declared appendicitis *the danger is extreme when the temperature is subnormal and the pulse over* 100. The moment you see such a case as this you should be aware that you are dealing with a virulent case of appendicitis, a case accompanied by acute general peritonitis. There is no more definite danger-signal than those two combined conditions of pulse and temperature. If you are well aware of this fact you will have no excuse for delaying the calling in of surgical assistance. This rule is absolute and definite. An operation should be done at once to try to save your patient, and you will then have done what is right even if you do not succeed. The question is, how far is the temperature chart a guide to the presence of pus? If the temperature chart remain high for more than six days you may suspect pus, as we do in the patient we have been looking at in Henry Hoare Ward. It is now the eighth day, and the temperature has not fallen, and therefore it is my intention to explore. I do not think I shall find a large amount of pus; but I have a strong suspicion that it is there, and it is probably confined between some coils of intestine. Therefore the right thing is to make an opening into the tumour and leave a drainage-tube in. It often happens that pus makes its way out two or three days afterwards. You may suspect pus when the temperature has subsided, and after two or three days it suddenly rises again.

Now I like to distinguish between symptoms and signs. The symptoms are those which the patient complains of, the signs are what you see for yourselves. The most common sign is rigidity of the abdomen. As a rule, at first the whole abdomen is distended and somewhat rigid or tympanitic. Later on, at the second or third day, there is local rigidity and tenderness. If the rigidity should remain general it means acute general peritonitis. After two or three days a tumour may be felt. Tenderness is always present, and is best marked at McBurney's spot, two and a half inches internal to the anterior superior spine. The reason for that being the site of greatest pain is that it is the spot where the appendix arises from the cæcum. The shape and size of the tumour varies very much, but you may have appendicitis without any tumour at all. If a long appendix hangs down in the pelvis, the swelling is situated in the true pelvis and you cannot feel it except *per rectum*. As to the composition of the tumour itself, it consists of intestines, peritoneum, exudation, and, possibly, pus. Therefore the tumour will not always be uniformly dull, for if you happen to percuss over a portion where there is intestine there is a tympanitic note, yet if the tympanitic note should remain persistent it means that there is gas in the abscess cavity. The facial aspect of the patient is distressed; there is a foul tongue and considerable thirst. If pus be formed and not evacuated the patient wastes and the urine contains indican or indoxy-sulphuric acid. It has been pointed out that in acute appendicitis with formation of pus there is an excessive number of leucocytes in the blood, and this condition is not found in typhoid fever. Therefore, by some authorities, leucocytosis has been relied upon as a sign of appendicitis as contrasted with typhoid.

Clinically, simple or catarrhal appendicitis is the mildest form. There is some constitutional disturbance, a temperature of about 100°, quick pulse, the bowels are confined, some local tenderness, and the attack ends in a few days. But the patient from time to time has reminders of what I may call the precarious condition of his appendix; in other words he has recurrent attacks.

A more severe condition is adhesive appendicitis with resolution. It is similar to the catarrhal appendicitis, but the attack is more serious and lasts longer, that is to say, from six to twelve days. In other cases a circumscribed abscess forms. It may ensue upon the simple catarrhal form, but more often upon ulceration of the appendix; or there may be acute necrosis or the bursting of a cyst, and the latter is more likely to occur if purgatives are given. Lastly, there are cases of appendicitis with acute general peritonitis from the first.

The diagnosis of pus is all-important. It is no good to wait for fluctuation. If you do, your patient will probably die in the interval. The fact that the patient has no rigors is no guide, but pus may be suspected under the following conditions, which I beg you to carefully note. First, if there be early diarrhœa and much early vomiting. Secondly, if the symptoms do not subside in six days. Thirdly, if the symptoms subside

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partially and then increase between the seventh and tenth days. Fourthly, if there be a very large tumour present early in the illness; because, with a large amount of adhesive inflammation there is more liability for a portion of it to break down. Fifthly, you may suspect pus if the mass do not subside after the tenth day. Sixthly, pus is probably present if there be a second rise of temperature between the sixth and twelfth days. And lastly, you may suspect it if the general condition be bad. All these conditions point to pus, and if it be suspected it should be looked for, and it is sufficient justification for operating in appendicitis that pus may be present. It may be so from the first without fever; and decomposing pus in the abscess cavity may cause the tumour to be resonant. There is grave danger in leaving the abscess unopened. A case came before me in which operation had been delayed until the abscess burst and a fæcal fistula formed. A fæcal fistula, however, is one of the least of the evils that patients may suffer from if fluctuation be waited for.

Latent Infection.—Adami takes up the subject of the existence and fate of bacilli in the blood and tissues, and from a thorough discussion of the researches that have been made comes to the following conclusions:—There is a passage of leucocytes through the mucosa of the alimentary tract, and these, while in part destroyed, in part find their way back, bringing with them food particles, among which may be bacteria present in the intestinal contents. During the active congestion which accompanies digestion the passing out and return of these cells is increased, and the germs find their way either through the lymphatic canals or portal system. In either of these they tend to be destroyed by leucocytes. By the employment of adequate methods it can be demonstrated that even in the healthy kidney and liver, in a large number of cases, in rabbits at least, a certain number of microbes are living in any one moment, so that cultures can be obtained from the organ on its removal from the body. It is probable, further, that in health a certain number of bacteria which have not been destroyed by leucocytes pass through the liver into the systemic blood. These tend to be removed by the kidneys and possibly by other glandular organs. In any case the ordinary methods at present employed in making cultures from the blood are insufficient to detect their presence unless they are in such number or of such a nature that they are not altogether destroyed by the bactericidal action of the shed blood. From these conclusions he infers that there is a latent infection—what the French term a latent microbism—that is, a condition in which residing germs are, under favourable conditions, excited into activity.—*Journ. A. M. A.*, Oct. 6th, 1900; *Chicago Medical Recorder.*

One of our most distinguished physicians, in discussing lately the question of hypnotics, mentioned trional as the most fashionable drug used to induce sleep at the present day. Trional may be the most fashionable, but undoubtedly in asylum practice, where efficacy and certainty are necessary qualities in the hypnotics used, the claims of sulphonal and paraldehyde are not overlooked. The self-evident dangers attending the indiscriminate use of opium are sufficiently recognised even by the laity to ensure due care being taken to avoid the morphia habit. It is certainly time that an earnest movement should be initiated to arouse in the medical world a wholesome spirit of scientific inquiry as to the ultimate effects of the continued use of trional, sulphonal, paraldehyde, and similar therapeutic agents. No practitioner of extended experience can have failed to observe cases where more care should have been exercised before condemning a patient to habitually look to drugs for procuring sleep; but in certain circumstances the use of an hypnotic is absolutely essential, and the conscientious medical adviser naturally desires to prescribe the safest. Recognising the favourable results obtained after careful investigation and experience of the hypnotic introduced into this country by Messrs. A. and M. Zimmermann, known by the name of Dormiol, or dimethyl-ethyl-carbinol-chloral, it is not unreasonable to forecast that its many advantages will ensure its acceptance and use not only in asylum, but also in general practice. The convenience of being able to prescribe, either in capsule or in a mixture, a reliable preparation free from unpleasant after-effects will be equally acceptable to consultants, general practitioners, and medical officers in public institutions.

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INATTENTION AND INEXACTNESS IN ORDINARY DIAGNOSIS.*

By J. MITCHELL BRUCE, M.D., F.R.C.P., LL.D.,
Physician to Charing Cross Hospital, etc.

I REGARD it as a high honour to me personally to have been elected President of the North-West London Clinical Society, and to occupy the place that I do this evening. My first duty on addressing you is to thank you sincerely for having given me this proof of your respect for me and of your confidence in me; my second duty is to ask you to extend to me all the kind indulgence that a beginner needs under the circumstances of his first appearance before a learned and experienced Society like this, and in succession to so many distinguished men.

In choosing your President for this year, I feel that you have been moved mainly by the consideration that the whole of my professional life has been devoted to clinical work: that for nearly thirty years I have been exercised in teaching Clinical Medicine. This being so (and our Society bearing the name that it does) you must not expect my address this evening to travel into other regions of professional interest. I might attempt to charm you with reminiscences of Medicine as it was when I was a student; or to call up for you a glowing vision of Medicine as it will be thirty years hence. No doubt you have listened to such excursions into the past and into the future already. They are inspiring as well as entertaining, and are therefore most useful in their way; but they demand a faculty for delicate and graceful handling which I do not possess. The clinical teacher does indulge in reminiscences now and again, particularly when he desires to impress his students with a proper sense of the remarkable advantages they now enjoy, as compared with their predecessors, in the means of observation, and a previous acquaintance with pathology. But

* An address delivered before the North-West London Clinical Society, Oct. 23rd, 1900.

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his constant work in the hospital wards is to teach his students how to observe; and, having observed, how to record their observations; and last, and most difficult of all, how to employ their observations in diagnosis, prognosis, and treatment. Now a lifelong occupation of this kind makes a man not only didactic but dogmatic in his style or manner of teaching. He is disposed to look upon those whom he may have to address as he looks upon his pupils. He lectures his patients. He finds himself instructing his professional friends who have called him in consultation. It were good for him if on such an occasion as the present he could emancipate himself from the habit that has grown upon him of giving instruction and of correcting faults; but it is natural that he should prefer to be sure of his ground. Wherefore you must very kindly forgive me and take the blame to yourselves if, being a clinical teacher, I fall into the old groove to-night, and speak to you, as it were, across the *kline* or bed; if I attempt to instruct you; if I even attempt to correct certain faults or failures of observation of which some of you may be guilty. After all, one of the ends of a Society like ours is to send its members home at the end of every meeting with a feeling that they have learned something that may be of use to them in practice.

Now let me say at once that I have no new method, no novel means of observation to announce to you to-night. Quite lately we have had many advances of the greatest value or promise; for example, the many clinical (as well as pathological) applications of bacteriology, the X rays, electrical illumination of internal parts, and examination of the blood. So valuable and promising, indeed, are these and other methods lately introduced or improved, and so attractive, that I have only to say to you—Employ them if you can, personally or with the assistance which is now so fully at our disposal; test them by older and assured methods; improve them, as even the family practitioner can do, by frequent use and faithful study of the result.

Now let me state my thesis boldly without further introduction. It is this: That a number of cases of familiar diseases of the first order of importance are occasionally overlooked in practice,—I might even say, *habitually* overlooked in practice. I propose, first, to prove the truth of this statement by reciting to you a few specific instances; and secondly, to tell you how, in my opinion, cases of this description are to be discovered, or, more correctly, are not to be missed.

Twelve months ago I was consulted by a lady of over thirty for what she called debility and falling away. The statement sent with her was that for years she had been tippling, and that the last time she was seen by a doctor she was smelling of alcohol, and had the general appearance of continued imbibing. This hint, it was added, might be of some use to me; and I was requested to tell her the naked truth, which had never yet been done. For six years her health had been failing, and her friends had first worried her and then shunned her. I found the patient to be a poor, wasted, delicate woman with a strange anæmia of the face, almost concealed by a high florid flush of the cheeks and nose. The expression was dull and depressed, the speech sluggish, clipped, and blurred; the hair was spare, dry, and coarse; the hands were dry and rough on the backs and shiny on the palms. She complained of weakness and weariness, and I found that she was the subject of suspicions of her friends' designs on her life. I will not go into the case in further detail. You will have guessed by this time what the nature of the disease was—myxœdema. Any doubt that there might have been on the point was quickly removed with thyroid. She is now once more an attractive and happy woman, taking her proper place with enjoyment in society.

A lady of sixty, of large build and full habit, was brought to me last summer for asthma, from which she had been suffering persistently for twelve months. The case was not peculiar in this respect, presenting the usual symptoms and signs; but I was struck by the heavy voice and speech, the very anæmic, sallow countenance, with "baggy" eyes and flushed cheeks, the big hands, the branny desquamation, and the scanty falling hair. I diagnosed myxœdema. A small dose of thyroid extract distinctly upset her: she had a degree of collapse with sweating; the hair was shed heavily, and wasting debility and an increase of asthma followed. But we persevered, for the aspect and speech of myxœdema had already disappeared within three weeks. When

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I last heard from her medical attendant about six weeks ago, it was to the effect that her friends were astonished at the change in her appearance, and that the almost white hair, which had nearly all fallen off, was being replaced by a growth of almost quite black hairs. There can be no doubt, therefore, about the diagnosis.

In the year 1893 a man of sixty-four was brought to me by his doctor for debility, albuminuria, fulness of the throat, and disorder of the voice, for which he had been under treatment for three months. Although the nature of his disease was unsuspected by his medical attendant, I succeeded in recognising in the patient a mild degree of myxœdema, and he was put on thyroid. Not only did he recover in six months, but now, seven years after, as a man of seventy-one, he works the whole day as a town traveller. He has taken thyroid steadily the whole of the time.

A lady of thirty-nine consulted me in the year 1894 for rheumatism and severe aching in the limbs. She was a handsome attractive woman, and it was easy to gather from her statement that her chief cause of anxiety was that she was losing the ability, and, indeed, the inclination for active social pleasure, to which she had been devoted. It was the character of the speech in this instance that made me suspect myxœdema; indeed, there was little else of an objective kind to suggest the diagnosis. But this was the correct diagnosis. Thyroid soon made her a happy woman again, and when I last saw her she continued so. This is the most striking of all these cases that I have seen, so extremely slight to all appearance was the degree of the disease; yet nothing could have been more satisfactory than the issue of the diagnosis and treatment.

I have risked wearying you with these notes of four cases of myxœdema, to prove, first, that a disease of the foremost order of importance may be overlooked; and secondly, that it is overlooked often, for you will observe that four cases of this comparatively rare disease must be a considerable proportion of all the cases I have seen within the last few years. Now I am sure you agree with me that to diagnose or to miss, respectively, a case of myxœdema means credit or discredit to the practitioner. Let us then entertain these considerations:—That myxœdema presents itself not uncommonly before us in practice of so mild a degree as to be overlooked; that we must be prepared to meet with it at any time; and that we must exercise constant care in our work lest we pass by a disease which is not only grave if neglected, but perfectly amenable to treatment if diagnosed.

I will now take up another class of cases. A few years ago a medical friend sent me for my opinion a married woman of thirty-eight, who, after having been robust and energetic and bearing six children, began twelve months before to suffer from distressing, indeed violent cough, and loss of strength and flesh, without the physical signs or fever of tuberculosis. The cough had declined after some months, but the loss of flesh and of energy increased, and a strange physical restlessness was developed, with fidgeting of the hands and twitching of the lips and face. More recently the percussion signs over the chest had become suspicious, and grave disease of the lungs was feared. Now the first thing that struck me about this patient in addition to her ill-nourished appearance was her expression of anxiety, her thin, flushed, perspiring face, and her trembling, damp hands. The hair was thin; the pulse counted 148; the heart palpitated violently; and there was well-defined enlargement of the thyroid. The woman had Graves's disease without exophthalmos or other obvious ocular phenomenon. But whilst the symptoms and signs of the disease were definite, so slight were they on casual observation that for a whole year the sole anxiety of her medical attendant was about her lungs.

I will not multiply these cases of ill-marked Graves's disease. I have seen a large number of them in hospital practice. We cannot doubt the occurrence of them, and in this you will agree with me; but I can understand that you may ask, "What's the good? You could do but little for them if you did discover them." Unfortunately, there is some truth in this suggestion. But, apart from the satisfaction that always accompanies correct diagnosis and the determination of the truth in every form, there is unquestionable advantage to the subject of Graves's disease to be under the care of a man who knows what he has to deal with, not under that of a man who is ignorant. Moral treatment, as we call it, is all-important in the management of these patients; and this alone, whether drugs are given or no,

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might be afforded them if their disease were recognised.

I will next select a case of acute disease which illustrates very strikingly the importance of my subject.

A rather undersized but strong boy of twelve, of good social position, was at one of our best preparatory schools last winter term when he was taken with what was called influenza, and regularly treated by the medical attendant of the establishment. He recovered and came home for the Easter holidays, when his appearance was considered so unsatisfactory that the family doctor was consulted. What did he find? That the boy was suffering from subacute rheumatism and dilatation of the heart, with a loud endocardial murmur. Three months later, when he was brought to me, he had still stiffness of the joints, many rheumatic nodules, not only mitral incompetence but a degree of mitral stenosis, double aortic lesions, and the signs of chronic pericarditis. Yet the lad complained of nothing, and there was a striking absence of that "cardiac *facies*" which so readily arrests our attention in the older subjects of disease of the heart.

One case of this unfortunate character will be enough for me to recite. It will serve to bring home to us a very serious consideration: that of the many cases of valvular disease of the heart that originate in rheumatic endocarditis during childhood, some might be prevented were the disease not overlooked entirely and the patient practically neglected. You will observe I am dealing no longer with diseases that might be called rare—diseases that some practitioners might say they missed because they had never met with them before,—I am dealing with a disease common in every class of practice. And I repeat deliberately that either from want of knowledge of the fact that cases of rheumatic endocarditis occur with few, or very mild, or possibly no symptoms and signs in the joints, or from some other cause, we do occasionally fail to recognise one of the most remediable of diseases, and yet one of the most disastrous in its effects if it be left to itself.

Had time permitted, and were I not in constant fear of boring you with details of cases, I would have read to you brief notes of instances of other diseases of the first importance which are often overlooked from some cause or other. Such are some cases of tuberculosis, of syphilis, of gout, of urethral arthritis, of malaria, of pernicious anæmia, of Bright's disease, of leuchæmia, and of others, some common, some rare, but all easily diagnosed if only they were properly regarded. I ask you to observe that in speaking of failure to recognise these diseases in practice I do not refer to instances of difficult diagnosis. My remarks do not apply to the experiences, with which we are all familiar, of failure to reach a diagnosis after a properly conducted investigation of the case and deliberate consideration of every fact. Neither have I taken up your time with the subject of doubtful observations and questionable interpretations, such as an impure cardiac sound or broken respiratory murmur, or a trace of albumen. The cases I have cited belong to a different category. They are instances of failure to diagnose, or, more correctly, to observe, perfectly obvious, unquestionable, and, indeed, familiar phenomena which are staring us in the face all the time.

I now come to that part of my address at which information ends and advice begins. You remember that I threatened you with this application of my theme. This is a clinical lecture *minus* the patients; and for having put me in this chair you must submit to the penalty of going through the form of being taught.

The question that you naturally put to me is this: How are these cases of minor degrees of serious disease to be discovered? I reply: By not overlooking them. It is not by making use of novel methods of investigation, but by making better use of old-established ones. If we reviewed the history of Medicine during the century that is now closing, I believe we should find that the introduction of new methods of research in Medicine tends to make us think less of original and radical procedures, and to neglect them. Did not the elaboration of physical examination distract the attention of the practitioner from the study of the physiognomy of disease? Has not clinical bacteriology in its application to the diagnosis of tuberculosis made us less precise and laborious in our use of the stethoscope in phthisis? Have we not now a short cut to the diagnosis of typhoid without detailed study of the temperature, stools, spleen, eruption, and state of the abdomen? Time-saving inventions and discoveries are the

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order of the day; and we rush after them in Medicine. The result is in some respects very unfortunate. The *disease* may be named by these speedy methods; but what do we know about the *case* or the *patient?* We are being led away insensibly from the simpler radical methods of clinical inquiry, with the result that is the moral of my address.

To begin with, we must *look at* our patients more, particularly their face, in a good light, whilst engaging them in conversation. If we did so, do you think we should overlook myxœdema—with its many characteristic features in integuments, hair, expression, hands, etc.? In many diseases the first flash of recognition that leads up to diagnosis is derived entirely from what we see by intelligent looking: to wit, the different anæmias, phthisis, cardiac disease, Bright's disease, diabetes, cancer, septicæmia, and many others that I need not name. Without attempting to be a Sherlock Holmes, the practitioner should cultivate the habit of keeping his eyes open to everything that is presented to them or that passes before them. Then, think for a moment what may be missed in the chest and abdomen from indifference to or carelessness of simple inspection—the situation and size of the heart, an aneurysm, a pleuritic effusion (which will be described as "latent" some weeks later, when it is discovered by a more careful observer), distension and deficient respiratory movements in the right iliac fossa which tell of perityphlitis. So with the attentive use of the ear—I mean the unaided ear, not the stethoscope. Consider the vital importance of what we learn by hearing—it may be before we enter the sick-room—the hydrocephalic wail, the hoarse crying of the syphilitic infant, the brassy cough of the man with aortic aneurysm, the moist, frothy, tracheal râles of a patient dying of influenzal pneumonia. Myxœdema, we know, is revealed by its perfectly characteristic speech. These are but examples of endless instances I might give you of the value of the attentive use of the ear. Nor need I do more than refer to the necessity that exists to keep one's eyes and ears open to passing incidents, however trivial they might appear to some. I have known abscess of the brain suspected, correctly, in empyema from the patient's casual complaint of being unable to make his neck comfortable on the pillow, and the approach of tuberculous meningitis in pulmonary phthisis by complaint of difficulty in micturition. These were instances of really attentive and intelligent clinical observation, and they had their reward.

Whilst we do not take the time or the trouble to look at our patients sufficiently, I believe we are also too often indifferent to the use of the *hands* in clinical investigation. Do we still cultivate and possess the *tactus eruditus* which used to be the boast of the physician and surgeon? Palpation is eminently a method of examination acquired by practice, and perfected only by laborious, intelligent, frequent, indeed continual repetition. The surface of the abdomen is the chief field for opportunities to employ the fingers in feeling. Think of the different sensations that are appreciated by the proper use of the hand and mind in different cases of diarrhœa in infants. How many facts of vital importance are revealed by palpation in acute abdominal disease—general distension, local gaseous distension (as distinguished from local muscular resistance), local diminution or possibly arrest of respiratory movements, the detailed characters of swellings at different depths from the surface, the precise distribution of tenderness, and so on. And there are almost as many useful opportunities of employing the simple hands in connection with the chest. We hear a great deal to-day of "dilatation of the heart." We ought to be ashamed to confess that a condition which was elucidated by Stokes, Skoda, Walshe, and other masters of Clinical Medicine forty or more years ago, and so plainly put before us by Gee when we were students, and by every good teacher of Clinical Medicine ever since, has lately become what might be called a fashionable disease. Were there no dilated hearts before the time of Schott? Or was it that we did not trouble to find them? or that we had forgotten how to find them? How many of us would deliberately spend it might be five minutes in the palpation of the præcordial impulse? And yet the characters of the palpable præcordial impulse—its extent, its distribution, its strength, and what may be called its quality, and the exact situation and features of the apex-beat, are often the key to vital problems of prognosis and treatment in cardiac dis-

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ease. The fact is that this condition—dilatation of the heart—is an instance of the difficulty which besets all clinical investigation, and too often defeats us, *the appreciation of negative observations*—weakness, absence, silence, and the like. Can I expect a student to be impressed as much by a præcordial impulse which he can feel only with difficulty or fails to find, as by an impulse that heaves his hand, or jerks his head in auscultation? And yet the one observation is as true as the other; probably far more important. Do I find that he describes weakness of respiratory murmur as if it had really struck him with its importance? And how often have not you and I, with all our experience, turned from auscultation of the posterior base of the chest in acute pneumonia at our first visit and said, "There is nothing there," when we ought to have said, "I hear nothing there; the lung must be engorged." And here let me remind you that along with cultivated and precise palpation there must always go another accomplishment, which I fear is often lost as we grow older in busy practice, instead of being perfected as it quite well might be, familiarity with normal anatomy, with landmarks, as they are called, with the situation, limits and mutual relations of the viscera, of the vessels, nerves, bones, joints, and muscles. As we pass our finger-tips over the abdomen, do we observe—could we always say—what organ or part of an organ is immediately underneath? Can we all unhesitatingly find the seat of the pylorus, the gall-bladder, the pancreas? And in the same way, when we are using the stethoscope over a patient's back, should we be prepared to reply whether we are auscultating the upper lobe or the lower lobe—a matter of the greatest importance prognostically in tuberculosis? One is almost ashamed to consider how the subject of our constant study for the whole of our professional life may remain unfamiliar to us topographically, apparently from indifference. It is not from indifference. It is from want of system. It is that we are in continual danger of falling into easy, slipshod, unmethodical ways. And want of system in this matter soon grows into an unfortunate habit, and this into ignorance and neglect. Contrary to the old proverb, *un*-familiarity breeds contempt of anatomy.

Confession of weakness and of fault is not sufficient to ensure improvement, neither is the making of good resolutions. Is there no artifice, then, by which we might induce or even compel ourselves to be more systematic and exact in our observations? There is, and an obvious and easy one, namely, systematic record. But not written record, which is not only laborious and therefore quickly abandoned, but, unfortunately, often inaccurate or incorrect, from the liberties which language habitually takes with the truth. In routine practice the record of the physical signs, and of some, at least, of the symptoms, should be graphic—that is by means of diagrams and charts. The advantages of the clinical diagrams now to be obtained in convenient books are many. First, they suggest records. Secondly, and this is the most important point of all, they compel exact record, for few of us will record a sign which does not exist, or map out an area or locate a tumour on a diagram made to scale unless we have faithfully ascertained it. Thirdly, they constantly remind us of our medical and surgical anatomy. And besides all these advantages, these graphic records are not only rapidly made, but instantly appreciated when referred to afterwards. Let me repeat, however, that these diagrams, above all, impress us with the conviction that what is worth doing in the way of observation is worth doing well, that is, with exactness and accuracy. The physical signs are best represented on them in hieroglyphics or graphic symbols—the respiratory and cardiac sounds, the different adventitious sounds, resonance, dulness of different degrees; also the outlines of the different viscera, of tumours, areas of tenderness, eruptions, and affections of joints, muscles, etc.

But I do not wish to suggest that the use of charts and diagrams is everything. As I have said already, the very employment of methodical investigation by physical methods has distracted us from that deliberate survey of the patient as a whole, and that estimation of his aspect, complexion, expression, manner and bearing, fitness, or strength, which our predecessors made with such success, and which is essential to the formation of a complete diagnosis. It is well to begin with this, whilst ascertaining the history of the patient's illness and the story of his present complaints, keeping our eyes, ears, and we may say our minds, open to every impression, and thus

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not only ascertaining the slight, transient, and changing features of the case which may be the key to the diagnosis, but steadily cultivating at the same time that faculty of attention or attentiveness to the matter in hand, which I am convinced has been one of the chief attributes of the greatest clinical observers in the past.

WITH DR. SAVAGE AT BETHLEM ROYAL HOSPITAL.

III.

GENTLEMEN,—To-day I want you to examine a patient, and to state in the certificate form which you each have, the facts indicating insanity observed by yourselves. After I have demonstrated a sufficient number of symptoms of mental disorder which are such as to satisfy you that the patient should be under care and control in an asylum, then from the case-book I will read to you facts which go to strengthen your certificate, because, although it is not absolutely necessary in signing a medical certificate to fill up the second part as to facts communicated by others—that is, if the certificate is strong enough from the facts observed by yourself. For instance, if the patient says, "I am glad to see you, as I am the King of England; I am the Almighty; I will give you a billion pounds at once; and if you will do this I will make you a duke;" and if, at the same time you are able to describe that his aspect is peculiar, and that his dress is extraordinary, such facts are strong enough, and you need not strengthen them by any other facts communicated by others. You will see, however, that the facts communicated by others, in many cases, are all-important. Thus, if you have a patient who will not answer any questions, who will not speak at all, you simply describe what you see; you certify as far as your own observation goes; and the nurse or the relatives will give important facts which will enable you to make a strong instead of a weak certificate. It may not be necessary always to communicate what is noticed by others, but in a certificate which might otherwise be weak, you can immensely strengthen it by some such addition as I have indicated.

The first patient for you to certify is suffering from acute mania. He is fifty-five years of age, said to be of no occupation. He says he is able to buy up immense properties and to make everybody's fortune. He is giving cheques on his bank to any one, as well as promising other cheques instead of money, there being no assets to meet them. He is most violent to all who oppose him in this matter. He struck the informant this afternoon for a slight remark when he remonstrated with the patient on his extravagance. He is sleepless; he writes telegrams and letters of the most voluminous and incoherent character. He wrote thus to me:—"I intend to invite my brothers and sisters to a little luncheon on the day I escape from this mad hole. Will you join us? No one will be received at that table more gladly than you. You appear to be the cleverest doctor I have ever met, and I have talked to thousands."

Here is a man who has the typical exaltation of ideas with defect of self-control, a man who will chatter all day long. Probably, normally he has been a reserved, self-controlled man who would no more talk such rubbish as he has been talking to you than he would do any other stupid thing. He has lost all self-control and is going headlong to destruction. The first thing one says with regard to such patients with such symptoms is, "Is he paralytic, or is he alcoholic?" Men who have been intemperate very frequently have this type of exaltation and loquacity, and also the same irritability. On the other hand, we shall have to notice very carefully whether there is any inequality of pupils or any change in his knee-jerks. You get shaking of the hand in alcoholics, especially in the early stage. You have seen the type of disorder that he is suffering from, and I ask you now to fill up your certificates. You will say on your certificate whether the facts which indicate his insanity are sufficiently severe to make it necessary to place him under control. You will not forget the fact that he imagines he is able to buy up a great deal of property, that he draws cheques for large amounts on bankers with whom he has no account, and that he is violent if people disagree with him. The papers will be corrected and returned to you.

We will now turn to the clinical subject for to-day. We have studied cases of mental pain, we have studied cases of defective control, and

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I am now going to refer to cases of defective power, defect of power to react to the surroundings. In these cases the characteristic of patients who are brought to you will be that they do not speak, they do not answer, they do not spontaneously act, and they do not readily react to any external stimulus. You will find that they are difficult cases to examine, in so far as they will sit silently in a chair doing nothing. Remember there are two great divisions in this class. I am in the habit of taking out my watch and saying, "Watch does not go; is it that it is not wound up or that there is grit in it which prevents it working?" The absolute fact is the same, that it has no direct relationship to time; it does not inform me of the passage of time, whether it is stopped by grit or whether it is not wound up. And so you will see patients who do not react to questions, who do not change with their surroundings, because, to use a common expression, they have no energy or will-power. Others are stopped by some panic, some grit in the works. Take as an example a lady I saw in Surrey yesterday. She had an attack of influenza eighteen months ago, and gradually has passed into a condition of apathy. It is only with the greatest difficulty that she can be got to wash and dress, and even then she only gets her breakfast by noon. She is roused by eight o'clock, and after a considerable time she is induced to get out of bed. Then she is induced to slowly put on one garment, and then she insists on sitting down till the next is ready, and so the morning is spent in her being dressed like a very heavy sluggish doll. She asks if we cannot give her more energy and power. She is cognisant of the loss of energy. We must consider such cases in the way I mentioned in regard to melancholia without delusions, that is to say, we have people who suffer from mental depression without delusions of unworthiness or wickedness, or of a hypochondriacal nature, just as we have others who have defective self control, and who impulsively do foolish things, and yet have no ideas of extravagance or exaltation like the patient who has just been examined. One sees connecting links between the sane and those suffering from stupor, such as those who slowly develop defect of will-power and are morbidly apathetic. And this apathy may go on and increase till the person appears to be absolutely mindless. I have seen patients who have never left their bed for ten to fifteen years, and who have been recognised by their friends as absolutely will-less individuals. Such are as difficult to treat as the hypochondriac who is possessed by some morbid feeling and a morbid interpretation of that feeling. Now to go one step further, the next stage is represented by the patient we shall see presently, whose feeble reaction is due to defect of will-power. Impressions either are not received at all, as far as their higher mental functions are concerned, or they are so slowly received that no reaction seems to take place; so that if they hear a thing they do nothing. The person suffering from melancholia, as a rule, is very slow in reaction, but he may react later but reasonably, and he may remember it. The external impressions are so slowly responded to that they seem like a stream in the desert; the stream is there, but it gets lost in the sand and never gets to the sea. And so these impressions which are made upon these stuporous or partly demented people seem to be lost, and they do not reach the centre, and, as they do not reach the centre there is no memory established, and there is no reaction whatever.

What are the physical causes giving rise to these states of stupor or of will-lessness? There are two groups, simple stupor, and stupor with melancholia. You have, as I say, conditions in which there is defect of energy, defect of will-power, and there are the other cases which have exactly the same aspect, in whom there is no will-power. It is arrested as in a panic. There are some people who seem to be suffering from chronic panic.

Here is a man in whom there is no reaction whatever. He will remain day in and day out in exactly this attitude. It is very possible a patient like this might starve in the midst of plenty. He might be set beside food and not help himself; he might sit in a chair although his bed was ready for him. He is without any proper reaction to the natural stimuli, whether they are ordinary social stimuli or organic stimuli of appetite and desire. There seems to be no knowledge of the passage of time in patients of this class. In them, too, or in the majority of them, there is little, if any, recollection of what is being said

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to and about them. There are two great groups, one in which the stupor is most marked, and the other in which the melancholia or panic is most marked. Those people who are suffering from stupor simply, or acute mindlessness, or acute dementia, who have no painful impressions associated with their state, are indifferent, and are often cataleptic. In this case there is more of the melancholic type, that is to say, melancholia with stupor rather than simple stupor. He does not allow his hands to remain in the plastic way that the ordinary demented patient would. And then, again, the aspect is rather one of a person who is ill, who is not strong or robust. He looks rather worn and ill. The person who is suffering from simple stupor is an eating, drinking, and sleeping machine, who remains where he is put, and eats what is given to him; who sleeps when he is put to bed, and when he is taken to the closet he obeys the calls of nature; but there is no independent energy or will. On the other hand, when you get cases of this type you encounter some resistance, but you get no answers. Until they improve you cannot tell what is the foundation of their condition. Some of them will tell you afterwards that they had some fearfulness, as of a nightmare, that during the whole of the time they were in this state they felt that the slightest exertion of their will would cause some frightful catastrophe. They believed themselves to be in another world, to be surrounded not by human beings but by some other beings who were anxious to destroy them. In a condition of this kind one has seen men believing they were going to be lynched, that they had caused some frightful epidemic, that they had caused the plague, or that they had caused a universal spread of syphilis, or small-pox, or cholera. But as they do not tell you that, you cannot judge of their delusion until they get well. One very important thing to remember is that there are various physical and various moral causes which lead either to stupor or to melancholia with stupor. The same physical causes may give rise to either; thus severe exposure to cold, shipwreck, privation, or some severe acute illness may cause the passage of the patient into a condition of this type. In the years past one has seen it follow cholera. A severe illness like cholera may leave a person stuporous, absolutely will-less; just as severe physical disorders of this kind will produce stupor or melancholia with stupor; so in the same way will poisoning. I have seen a person who attempted suicide by chloral, or by some drug of that kind, such as opium or morphia, pass from a condition of active melancholia into one of mindlessness or of stupor. I have seen the same results follow attempts at strangulation. The same symptoms may follow fright, a thunder-storm, a fire, an accident, as being thrown from a carriage; moral shocks in the same way will produce it. Thus a man who is falsely accused and taken to prison when there is no foundation for the charge, may rapidly pass into such a state as this. I have known a young officer after his first engagement with South African savages for the first hour or two show very little harm from it, and then he would rapidly pass into a condition of stupor. Women who have received severe shocks, who have been cast off by their lovers, who have been seduced, or who have had illegitimate children, may rapidly pass into a condition of stupor of this kind. In nearly all these cases there is, as might be expected, a physical basis of slow reaction; that is to say feeble circulation. The whole of the functions are slowly performed, although they may be normally performed. Of course the necessary treatment is by physical remedies rather than anything else. If seen early, the patient is put to bed, and massage does an enormous amount of good for patients of this kind. Although massage is a treatment which is of very little good to cases suffering from ordinary melancholia, yet in many cases of stupor in which the patients are badly nourished, and where the circulation is feeble, it does a great deal of good; feeding, rest, and stimulation to the skin, and sometimes the use of electrical baths, or baths with mustard in them, are the main lines of treatment. In many of these cases you must bear in mind that you can often learn more from the history of the case that is told you than from merely looking at the patient. This man before us may be a perfectly curable acute case; but, on the other hand, he may be an incurable case passing rapidly on to chronic dementia. The mere aspect is the same in both, and in describing him on a certificate you would simply say he has the aspect of

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weak-mindedness; that you can get no answer to questions, that you cannot get him to do anything that you wish; and, if you wish to make it stronger still, get food and put it before the patient and see whether he will take it. When you ask the friends or nurse you will very likely find that there has been a passing of urine in the clothes, and if this is so, it should be noted in the certificate. He is twenty-six years of age. The cause of his condition is supposed to be morphia, that is to say he was a subject of the morphia habit. There is some constitutional weakness but no marked family neurosis. He seems to have taken morphia for some considerable time, and he also seems to have taken a good deal of alcohol. When he was admitted he seemed to take no notice of those about him; he would reply to no questions, and one could not get him to utter a single word. His expression was morose and sullen, almost idiotic. His attitude was fixed and immovable on the whole, with twitching of some muscles of hands and face, which seemed to indicate, in the only way he could, his annoyance. So here is a young fellow who seems to have been the victim of morphia. One does not know whether the present state followed a large dose or whether it followed continuous small doses of alcohol and morphia. One of the tendencies of alcohol more particularly is to produce conditions of stupor, and when we come to consider in detail the effects of alcohol in the production of insanity I shall have to point out that there are grades and degrees of this alcoholic stupor, as there are grades and degrees of weak-mindedness dependent entirely upon alcohol. I saw a very charming-looking lady of about fifty this morning, who, as a result of alcohol, has no will, no desire, no memory. She smiles, and if you ask her how she is she replies that she is very well. Asked how she slept, she says, "Very well." "Where do you sleep?" "Let me see, where do I sleep?" I asked, "Is your husband in England?" She immediately said, "Is my husband in England?" "Have you seen any doctor on board ship?" and the reply is, "Have I seen a doctor on board ship?"—turning in each case to her companion. Having been kept in my waiting-room for ten minutes I asked her how long she had waited. "I have not waited at all." There is, in her, absolute defect of all recent memory, absolute defect of all desire. She would take her food, and a minute afterwards would say, "Well, is it lunch-time?" She would accordingly eat until she was ill, and then begin again. She is contented and restful because she has no will, and no desire, and no power.

Here is another patient who has no reaction. He, too, will not answer questions. The last patient we had in, gave you the idea of one who might have some delusion, or some dread or fear that rendered him so passive and so quiet. Here there is very little of that appearance. Remember that patients in states of this kind may be really on the road to recovery. I have already pointed out at lectures that mania, melancholia, or dementia (mindlessness) may be stages of a disordered mental process. Most disordered mental processes begin by depression, and are followed by exaltation and defective control, and then follows more or less mental exhaustion. The period of resistance may last for some time and then suddenly and temporarily pass off. Such conditions remind me of automatic cisterns, which go on filling, and while they are filling you have nothing to see, but when they are full, the whole event is changed, and there is evidence of action. The practical point is that such stuporous patients may have sudden impulsive outbreaks, or they may recover suddenly. Such people are said sometimes to be cured by miracles; or cured by accident. I remember a patient like this in Bethlem Hospital—a lady. For months she had done absolutely nothing but sit alone; she had to be fed and dressed; she was perfectly indifferent to everything. One of the attendants said one day, "We must get this place ready; the Bishop is coming round." "The Bishop!" she exclaimed, "Which bishop?" The Bishop was the touchstone which just tilted the balance and put her on the road to recovery. In the same way I remember an artillery officer, who had passed into a condition of this kind. I one day said, "Attention." Immediately he clapped his hands to his side in military style. I happened to say the right thing at the right time. Another case was that of a lady who for a year had not spoken a word to anybody. But one fine May morning, when the attendant went into her bedroom and opened the window,

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she suddenly said, "Good morning, Jenny." The attendant was so astonished that she ran away and thought there was something uncanny about it. A lot of patients for a time are slowly filling up their cisterns of nerve-power, and that is the best thing that can happen to people who have had attacks of acute mental disorder. They may pass into a stuporous condition; but although they may appear stuporous you must not say that they are hopeless until you have tried many things. In these patients, though they may be comfortably placed, in a home or a hospital, you have to break down adhesions. I saw, years ago, a lady, a doctor's wife, who had had puerperal insanity. She was very bad, suicidal, and had to be sent to a private asylum. She passed through the acute stage into a stage like this. I said to her husband, "Move her." He said, "She is very comfortable there." I said, "Yes, too comfortable." So he went one day to the asylum and brought her out. But on the way to the railway station they stopped at Bethlem Hospital to express their feelings towards me, not kindly ones. He said, "You made me take my wife away and she has not said a word to me, except 'Why do you take me away from that nice doctor at the asylum. I had no trouble, no family, no husband, no domestic cares there; I do not want to be moved.'" I said, "You will be grateful and you will ask me to see you again next month." "No, never," was the reply. But she did, and she kept well for years. She has had one or two more attacks, but she is still living. Although conditions of stupor are very unfavourable in aspect, a certain proportion of them get well, and those conditions of stupor which follow upon an acute illness are much more favourable than those that come on without any definite cause, so far as can be ascertained. And also it is well for you to recognise that just as there are individuals who never grow into manhood or womanhood, so there are certain adolescents who get to a certain height and then retrogress and pass into a state of weak-mindedness. Such cases are very unfavourable. If you are consulted about a patient with an aspect of this type, who is eighteen, or nineteen, or twenty years of age, with a history of a bright boyhood and active and intelligent youth, but who, when going into business or a profession seems to suffer an arrest of development and slowly goes back, it is a bad outlook.

These people seem to have energy enough to develop, but not enough energy to go through the reproductive stage. Here is a gentleman of this type. In his case the chances are that there is a brisk knee-reflex. In nearly all these cases where there is preoccupation of thought, where the intellectual head is cut off, so to speak, you get exaggerated or brisk major reflexes. The treatment in cases of this kind depends upon general hygienic measures. Electricity is useful sometimes, but electricity in the treatment of the insane is very doubtful in its efficacy. I saw this morning a young Hebrew, who is definitely congenitally weak-minded. He is living with a doctor, and the doctor is most considerate and kind, and the patient's manners and morals are being developed as far as they can be. He said, "What do you think of my treatment? I am galvanising him for so long daily through his head." I said, "Yes, amusing, experimental." It reminds me of Sir Samuel Wilks saying, many years ago, that he was called down by a Guy's man to see an idiot in the country. The doctor said he had been trying everything he could; he had been giving the idiot phosphorus in every form. Dr. Wilks said, "Do you expect to give him a convolution in that way? Otherwise, I do not see what good will follow." So, although electricity is useful in some of these cases, if they are of the weak-minded type which I have described you will do no good. This patient is from another asylum, he is thirty-three years of age, married, and has one child aged three and a half years. He has been in this hospital seven months. There is no insanity in his family, although his mother and father are very nervous and show a tendency to hypochondriasis. This patient is always nervous about his health. This is, however, the first attack of insanity he has had. He suffered from some punctured wounds, which were self-inflicted. The first of his symptoms were markedly melancholic; he thought people were interfering with him, and that he was going to have fits, and that he would be paralysed, and therefore the sooner he killed himself the better. On admission there was marked evidence of mental depression. For years he has been anxious and worrying about

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his health. This gentleman escaped from the hospital one day as you students came in and left the door open, and walked to Wimbledon and into a drain-pipe there, and he stopped there until he was brought back again. Probably if he had not been found he would have stopped there and starved. He was very feeble and tremulous, constantly twisting his fingers. Common sensibility is good; the general aspect is one of depression. There is no history of any serious bodily disease. His tongue is pale. He takes his food fairly well. His bowels are confined. The urine is normal, specific gravity 1026. No physical ailment, as far as one can see. It is noteworthy that in these cases if you give remedies at all probably the best internal remedies are the cardiac tonics. I try rest, massage, Turkish baths, stimulation of one kind or another. Medicines would be digitalis or strophanthus, or strophanthus and caffein, or strophanthus and nitrous hydrochloric acid, or nux vomica. At the same time it is absolutely necessary that you should feed such patients well. In a certain number of these cases port wine may do a great deal of good. Of course the treatment depends to a great extent on what the cause of the trouble has been. If the individual has brought himself to that condition by excess of alcohol, then it must be knocked off. If people have been taking morphia or alcohol, and weak-mindedness has been produced as a result, the alcohol or the morphia should be knocked off at once, not slowly. It may be a severe trial at first, but it has to be done.

Here we have another patient in whom the aspect is a typical one of depressed apathy; there is no response to questions. The patients we have had in on former days have hardly given me an opportunity of talking, but these cases of stupor and dementia necessitate my talking all the time. I feel it is most important for you to get the image of this patient and his look and expression into your minds. In such a case as this you have to ask yourself, is this a primary disease, or is it a secondary disease; that is to say, has it come on slowly with weak-mindedness; has it come on as a result of acute illness, bodily or mental; does it depend upon some organic, brain, or nerve lesion, or upon some mental state following upon a bodily state. People appear to be silly if they receive no impressions from without. The deaf and dumb person, unless specially educated, becomes out of relationship to the world, and because he is dumb may appear a "dummy." In the same way certain deaf people pass into conditions of lack of interest in the world. There are certain other individuals who pass into this condition because there does not seem to be in them the power to regulate and assimilate impressions. There are certain weak-minded individuals, such as you see at Earlswood Asylum, who seem to see and hear, but the impressions are not registered. There is a difference between making an impression on a lake by throwing a stone into it, and making an impression upon putty or on plaster of Paris. In the case of most of you the impressions produced are more or less putty-like; they are fairly useful and retentive, I hope; fortunately they are not absolutely fixed. The weakest people are those who never forget anything; these have memories of the plaster of Paris type; their ideas and thoughts do not get organised to fit into anything else. There are certain people whose appearances are like this one, who receive impressions but do not seem able to organise them. There is a third group in whom the impressions are dulled or stopped by their painful nature. The soreness of a man's hand may arrest the movement he might desire to make; and that is the case with impressions. Every impression which some people have is painful, and the impressions therefore seem to be arrested in their progress.

Here is a patient who at first would not answer at all, but probably if we spent the whole afternoon with him we might get half a dozen answers out of him. If people are only weak-minded they sleep well; if they are melancholic they do not sleep well. If they tend to weak-mindedness their food is taken, assimilated, digested, and the other functions are performed fairly normally. If they are melancholic they neither take food voluntarily nor accept being fed willingly. They are oppressed by some idea that they ought not to take their food, or that the food is poisoned. An ordinary person who is weak-minded may get quite fat, but the melancholic patient, as a rule, does not. As a rule, the melancholic patient remains weak physically while depressed, and

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bodily and mental gain occur together. Of course, it does not do at once to say because a man has got that aspect that the condition is necessarily and essentially either weak-mindedness or melancholy with stupor. A man may be possessed by some delusion. He may be crushed, as it were, with some definite idea. I have mentioned a case in which I was able to get the Archbishop of Canterbury to annul the vow of a man who was in this attitude; yet I was perfectly sure that he understood everything that was being said to him. I got him to write down the statement that he would never speak again until he was ordained Deacon of the Church of England. I pointed out to him the absurdity of the thing. Later he wrote that the only person who could annul the vow was the Archbishop of Canterbury. That was a great number of years ago, and the then Archbishop being on very friendly terms with the authorities at Bethlem Hospital, was induced to annul the vow, and the patient recovered. The patient looked very much like this one, and yet he was perceiving everything. His aspect was the result of a delusion. So you may have an aspect of this kind as a result of mind defect; you may have it as the result of some chronic or some oppressing delusion; or you may have it as a slowing down of the perception as the result of some state or condition of the brain that is generally represented by melancholia. There is a slow reaction, an indifference to sentiment, and to everything else.

One other important point in relation to such patients is, that placid as they seem, you must remember that they are also sometimes not unlike those cisterns I was speaking of; these placid people will sometimes do an impulsive, destructive, suicidal act. So although a person may appear to be perfectly indifferent and plastic, so that you may feel you can safely leave him in the room by himself, attendants are, not infrequently, thrown off their guard in private by such patients as these. I have been many times consulted about patients who have been left in the upper stories of a house, and when left to themselves have thrown themselves out of the window. Therefore do not assume that there is no danger in regard to these individuals, however calm they may outwardly appear. One has seen patients of this sort wholly indifferent to fire, so that if they have fallen into the fire and burnt themselves very seriously they did not seem to try to save themselves. I have known such patients lie for hours in wet and cold places; and certainly I have known one such case at least where the patient was drowned in six inches of water. The patient simply tumbled over into the mud and seemed to have no energy to get out; but I am sure it was not intentional drowning. There is also the danger that such patients may have outbreaks of violence of a very marked type.

There is one other special point I want to refer to in connection with these stuporous, partially demented individuals, and that is that in many of them you will be able to get a history of masturbation; in fact, one of the forms of insanity that has been called masturbatic insanity is associated with a slowly developing indifference to surroundings, a tendency to lie in bed, a tendency to neglect all external stimuli, the stimuli of duty, or even of necessity. You also, in such cases, get a tendency to explosive violence. Although a certain number of these cases do recover, they are distinctly unfavourable. Remember that, whereas there is a general belief that youth is on the side of people who are bodily ill, certainly youth is not on the side of those who have mental disorder. The younger the patient with an attack of insanity, the less likely is he to recover. A mental disorder occurring in infancy means idiocy or imbecility. A mental disorder in early youth almost always means defect of mind, and moral control. If there be attacks of insanity at the unstable period, at adolescence, a large number of such patients suffer from weak-mindedness or permanent instability.

There is one other point. If you get a person who does not react normally to his surroundings, but whose general health becomes perfect, who eats, and drinks, and sleeps, and is nourished perfectly well, and yet his mind does not improve, the prognosis is bad. If your watch, after having been cleaned, still loses five minutes a day after everything has been done to regulate it, it shows there is some mechanical defect in it. So there are a large number of patients who, having had acute attacks of mental disorder, passing into a state of more or less stuporous dementia or melancholia with stupor, never improve.

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WITH SIR WILLIAM BROADBENT AT THE MEDICAL GRADUATES' COLLEGE AND POLYCLINIC,

OCTOBER 16th, 1900.

HERE is a man about thirty years of age, who has been under observation for two years for lameness and pains in his hip. Apparently his general health is pretty good. His occupation is that of cats'-meat man. He says that when he gets up in the morning he has a good deal of pain in the foot, which shoots upward into his leg. The trouble is one which dates from boyhood, and he has been more or less lame ever since that period of his life. He says he feels as if he has "no power in the balls of his feet." You will notice that the toes are deflected considerably, and one has seen the big toe deflected to such a degree as to lie under the other toes. You will notice that he has got no arch to his foot at all. I do not think there is anything in the case beyond the fact that he is a flat-footed man. He says he cannot walk for more than a quarter of an hour without resting; there is no spring in the foot whatever. He tells us that he has done no work for twelve months, and that he has tried all sorts of boots. He finds he can wear a heavy boot much better than he can a light one; and that is just as we should expect, because the heavier one would give him more support. He has had boots specially made, with the idea of relieving his deformity, but he has not had relief from them. He says the only relief he has had has been secured by soaking stale bread with water, and then squeezing it out and applying the dough to the foot, letting it remain there for three or four days before removing it. Sometimes in the morning there is no swelling, or very little. The condition of the veins over the foot aggravates the accompanying condition. Generally one element in the success of treatment of such cases is absolute rigidity of the sole of the foot, and another is some appliance to rest the inner border of the foot, and thus substitute an artificial for a natural archway. He is now having electricity applied to the part. No doubt the condition is started by bad boots, and the mischief produced by the boots often proceeds to a stage beyond that which might be expected.

The next patient is a woman aged forty-two, who has suffered as long as she can remember from dyspepsia. During the last four years she has had pain, which was limited to the left side of the abdomen. She has been to several hospitals, but has not been able to obtain relief. She passes a considerable quantity of urates, but she has no albumin in the urine, and the specific gravity of it is almost normal. As far as can be gathered, there is a slight history of alcoholism, but possibly there is nothing more than a gastritis. She has had no vomiting at any time and there is a question whether there is any organic mischief. On examination one finds that wherever pressure is made over the abdomen the pain is referred to the point in the back which is so constantly associated with gastric trouble. We do not find any evidence whatever of dilatation of the stomach; one can say definitely that the stomach is not dilated. Then we get some further interesting points—that all over the left side of the abdomen the nipping that one employed in order to see if there were any hyperæsthetic areas in connection with stomach trouble produces marked artificial urticaria, which is more marked over the comparatively limited hyperæsthetic zone. This hyperæsthetic zone is identified by pinching with the same degree of severity at different points, and we find that as soon as we get to a particular nerve area we produce by the same amount of nipping a greater pain. The same thing is observed when one carries a pin-head with equal pressure over the various parts of the body.

With regard to the treatment, of course the indication is to spare the stomach. The extraordinary feature of the case is that, notwithstanding that she is taking comparatively little food, she is getting fat, not only over the abdomen, but over the body generally. It is a form of tissue degeneration. The question arises in my mind whether it is not worth while in some cases to short-circuit the stomach, to attach the duodenum to the stomach so as to let the food pass straight into the duodenum. That is a question which one will have to submit to some very experienced surgeon; that is to say in a case where the local conditions are such as to justify holding out a reasonable hope of success. Of course you do not get the same results from withholding food by the mouth and using nutrient enemata in these cases of chronic gastric ulcer as in acute. This woman mentions a very interesting

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fact, and she does not seem to be a person who would exaggerate or distort what happens. She says she has passed recognisable blood-clot following an ordinary motion. Now that blood-clot cannot possibly have come from the stomach, nor from the duodenum; it is not possible for blood to travel through the whole length of the small intestine, and be exposed to intestinal movements, and not show evidence of it. There must be a considerable amount of adhesion to the stomach, and there is a possibility of adhesion taking place between the stomach and the colon, and ulcerating through from the stomach into the colon. That would be short-circuiting with a vengeance, and it would not answer our purpose at all. We cannot go further than conjecture about this patient.

Our next patient is a woman aged thirty-nine, a housekeeper. Her present illness started three weeks ago, when she vomited a wineglassful of dark-brown blood. Twenty minutes before vomiting she felt very faint, and three days afterwards she observed that her motions were dark brown in colour. There has been no recurrence of hæmatemesis, but the motions continued dark, and she has suffered severe pain over the abdomen. She has much trouble with flatulence, and cannot feel comfortable in any position. Her bowels are usually constipated. She has had attacks of diarrhœa at intervals, and has got much stouter lately. She has had several attacks, and has been treated in hospitals on five occasions. At seventeen years of age she had one of her ovaries removed along with a tumour. She has always been regular in her periods. She has vomited blood before; previously the quantities vomited were very large. The last attack of that kind was two years ago, and she was then laid up for five months in hospital. After that she got a little stronger, but very soon afterwards had soreness in the stomach and a cough. Practically she has not been well for five years, and has always been troubled with some burning pain in the stomach and bowels. Sometimes food would relieve the pain, but she has not noticed any definite relation to food. Her vomiting has taken place particularly in the morning. When her pains have been very bad the vomit has been streaked with blood. In 1886 she appears to have been in St. Bartholomew's Hospital with pain down the groin and in the limbs. There is no evidence to be obtained by clinical examination of anything wrong in the pelvis or in the abdomen. I should say that it is essentially a nervous disorder, but what it dates from is uncertain. She is married, forty-two years of age, and has had no children. Of course there is a suggestion of ovarian trouble, of which the fact that the pain started in the groin is very suggestive. Nothing can be felt in the form of a tumour. Sometimes the ovary in such a case becomes adherent, and that simple fact may give rise to much trouble. I do not think there is any serious organic disease present, the patient is too well nourished for that.

ADULTERATION OF MILK.

BY

WALTER C. C. PAKES, D.P.H.(Camb.), F.C.S.

THE specific gravity of a pure sample of milk obviously depends upon two factors—the total solids increasing, and the fat decreasing it. If fat is abstracted, the specific gravity will be increased, while the total solids remain constant. If solids are added, the specific gravity will increase as well as the total solids.

It has been found that the specific gravity, total solids, and fat, bear a somewhat constant relation to one another. Advantage has been taken of this fact, and a formula has been calculated for deducing the fat from the specific gravity and the total solids. This is a great advantage when many samples of milk have to be estimated, because the estimation of the fat requires more attention than that of the total solids.

When a milk vendor finds that the consumption of milk exceeds the production, there are three courses open to him: first, to reduce the consumption; second, to increase the production; and third, make the production fit the consumption. The last course is not altogether unknown, and in order to follow it, he adds water to the milk. Sometimes he wants to sell a little cream, and then he removes a little. If he abstracts cream, he will raise the specific gravity; if he adds water, he will lower it. He is aware of the fact that some of the consumers have lactometers, and so he judiciously abstracts cream *and* adds water, and

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so adjusts the ratio that the milk has a normal specific gravity. What influence will this have on the examination of the milk? As he abstracts cream he will decrease the percentage of cream, and as he adds water he will reduce it still further.

The addition of water will also reduce the total solids, not fat, and as the fat is reduced the total solids will be diminished.

If a sample of milk is submitted for analysis, and we want to know whether it has been diluted, it is necessary to know what standard is to be adopted, and upon what estimation we must base our deductions.

It has been found that the most constant factor in milk is the total solids, not fat, and it is from the estimation of these that the inferences are drawn.

It has previously been remarked that there is a great variation even in the milk from the same cow, and this is even more marked when the milk is drawn from different cows. If we took a series of samples of milk and estimated the total of solids, not fat, we should find a considerable difference between the percentages, and we should be able to strike an average. If we took this average as the standard, it is evident that we should condemn some of the samples in the series from which the average was computed. This would thus be obviously unfair.

What must be done is to find, if possible, the lowest figure ever reached by a pure milk, however poor. The result of a large number of observations has shown that a pure milk never has less than 8·5 per cent. of solids, not fat, or 3 per cent. of fat. In estimating the amount of added water, therefore, these figures must be taken as the standard. Very few samples of pure milk would be as poor as this standard, and analysts on account of this always return their results as "at least x per cent. of added water."

It will be readily seen that any given sample of milk might be diluted with a small percentage of water, and yet pass muster.

For instance, a sample of milk having specific gravity 1032, fat 4·5 per cent., solids not fat 8·9 per cent., might be watered to the extent of 5 per cent. and yet no analyst could prove that water had been added—at least, by the above analyses.

Various preservative agents are added to milk from time to time, such as formalin, salicylic acid, boracic acid, etc. In London the consumers appear to imagine pure milk and that containing a proper proportion of cream has a distinctly yellow colour. The vendors, therefore, frequently add annatto or one of the aniline yellows. Most of these have no harmful properties, and are therefore comparatively unimportant.

The above remarks on the adulteration of milk are taken from the recently published volume, entitled 'The Science of Hygiene, a Text-book of Laboratory Practice,' by Walter C. C. Pakes, D.P.H.Camb., F.C.S. The volume consists of less than 400 pages, and collects under one cover all the information necessary for passing the various examinations for the Diploma of Public Health; it is further elaborated sufficiently to be of real practical use to Medical Officers of Health. The great difficulty hitherto has been to find a book which can be safely recommended as dealing in a reasonable compass with all the practical laboratory work which is now required from the candidate for the Diploma of Public Health. The exceedingly able and attractive manner in which the author has set forth his views and given expression to his opinions is well shown in the short extracts from his book on adulteration of milk which precede this paragraph. A good instance of the very matter-of-fact advice offered by the writer is found in the few words devoted to pointing out how necessary it is to use a good microscope in bacteriological work. As years go on and better microscopes are required for elementary biology and physiology, the various apologies—often heirlooms—which are produced by students on their appearance at hospitals will disappear. To this the author adds that it cannot be too well understood that the small stands without substage condensers, without proper adjustments, and without nose-pieces, are almost useless for the work described in his book. They certainly are most undesirable. The work will no doubt appeal to those interested in the study of the parasites of the human subject, and the portion of the text-book dealing with these points is a model of conciseness and a pattern of clearness in diction. The publishers, Messrs. Methuen, have done their part well, and there is no lack of illustrations for the better understanding of the text. The readers of this treatise will find themselves spared wearisome descriptions of many methods of attaining one end, because the author has wisely restricted himself to particularising only those methods that have given reliable results in his laboratory. The volume is sure to command the attention of all those engaged in the public health service, and it can be confidently recommended as a very clear and correct guide for students.

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WITH DR. HALE WHITE IN THE WARDS OF GUY'S HOSPITAL,

2nd OCTOBER, 1900.

HERE is a man æt. 33, who came in on August 30th, with a high temperature. He was coughing up a quantity of very foul-smelling sputum. The first thing we were able to infer in the case was that as the sputum smelt so foul it was decomposing. It also seemed a fair inference that, as it was decomposing, his temperature was really due to septic absorption from his bronchial tubes. As the sputum was decomposing it probably lay in his tubes for some time, and therefore it is only fair to infer that the man had dilated tubes. The next step in the argument was as to the cause of the retention of the secretion in his tubes. During the routine examination I looked at his larynx, and if you will look at it you will notice that his left vocal cord is completely paralysed. Now when you find the left vocal cord immobile it must be clearly from one of very few causes. It might be that there is some local disease of the larynx, at the crico-arytænoid joint, and whether that is so or not could usually be seen with the laryngoscope. There was nothing of the sort here, and therefore it follows that the motor nerve-fibres going to the muscles of the larynx on the left side are paralysed. In nearly all cases that is because something or other presses on the recurrent laryngeal nerve. Of course it may be that there is something damaging the vagus higher up, above the recurrent laryngeal nerve. I have seen a man with growth at the base of the skull which has pressed on one vagus and caused paralysis of the corresponding vocal cord. I have also seen a man with cerebral tumour with paralysis of his left vocal cord. But nearly always paralysis of one vocal cord means that there is something pressing on the recurrent laryngeal nerve. We could not have diagnosed the case at all if we had not

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looked at his vocal cords. But, having done so, the interpretation was easy, namely, that he had something in his chest which was pressing on the left recurrent laryngeal nerve and also on the left bronchus, hence the retention of secretion in the bronchi, and hence also the decomposition and the septic absorption. That view was confirmed by the fact that when he takes much exertion air enters the left side, but certainly not so well as the right, because the left bronchus is compressed.

If that was the right way of looking at the case, it was probable that by disinfecting his retained secretion we could bring his temperature down. After watching him for a while we caused him to inhale creasote by putting him, for two hours a day, in a creasote chamber in which creasote was volatilised; and we gave him cubebs by the mouth, because the cubebs contain a volatile oil which is excreted by the bronchial mucous membrane and is a powerful antiseptic. The result proved that this view of the case was correct, because, from a few days after the beginning of the treatment the temperature has remained much lower, he has felt very much better, and the expectoration no longer smells.

The next point was, what could it be that was pressing on the left recurrent laryngeal nerve and the left bronchus? It might be a growth or it might be an aneurysm. It is much more likely to be an aneurysm than a growth because he does not look wasted, and because aneurysm is much more common. We have no evidence which it is. We know there is something pressing on the recurrent laryngeal nerve and left bronchus. The case is a good illustration of medical induction, and it all hangs upon examining his larynx and finding the cord immobile. The cord lies in the cadaveric position, because the adductor and abductors are both paralysed. If we had seen him a few weeks ago we should not have found the cord in the cadaveric position, but adducted. It is a fact important to be remembered, that when the recurrent laryngeal nerve is pressed upon, for some reason the abductor fibres get paralysed before the adductor, and the cord gets adducted and lies in the middle line. Later on both sets of fibres get paralysed, and hence the cord gets into the cadaveric position. The aneurysm is not large enough to cause any dulness, and it does not happen to be causing any murmur.

This patient is a man æt. 24. Six months ago he began to complain of pain in the back, and the pain gradually got worse, so that it is now very severe indeed, so severe that it keeps him awake at night. A month ago he was admitted into the hospital, and we found a most obvious tumour in the upper part of the abdomen and chiefly to the left of the middle line, principally under the upper part of the left rectus. You cannot help noticing that it pulsates. It may be either that the tumour is pulsating itself, or that there is a non-pulsatile tumour resting on the aorta. The way in which we try to settle that point is by putting our fingers on either side of the tumour in the way I show you, so as to appreciate whether there is any expansile pulsation. If at each pulsation the tumour gets bigger and your fingers are separated, you infer that more blood is forced into it; if it does not, you infer that it is simply lifted up by the vessel underneath it. You find it expands and gets bigger itself, and therefore we can exclude any tumour simply resting on the aorta, such as hydatid cyst, pancreatic cyst, and so on, and therefore the tumour can be only one of two things: either an aneurysm of some big vessel, probably the aorta, or the cœliac axis, or it may be some vascular new growth, such as sarcoma. At each pulsation more blood would be driven into it, causing it to expand. Which of these two it is we have no means of settling. But either of them would cause the great pain in the back which the patient suffers. It is an excellent case for you at the beginning of your work, because it teaches you the great importance of appreciating whether or not a tumour of the abdomen is expansile. Other things which help us in deciding the diagnosis are these. If it were a tumour which is pressing on the aorta there is no particular reason why it should cause such great pain in the back, because such extreme pain as this man suffers suggests that the vertebræ are being eroded. They could be eroded by an aneurysm or by a growth; they would not be eroded by a pancreatic cyst or by a hydatid pressing on the aorta. The swelling has rapidly got very much bigger, and that fact is very much in favour of either aneurysm or growth. He has

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been here just a month. I do not think he looks quite ill enough for it to be a growth; but, on the other hand, he is young for aneurysm. That question of the age in aneurysms is interesting, because there is a distinct class of aneurysms which occurs in young subjects. We know that aneurysms generally are due to syphilis, but occasionally they occur in young subjects, and I strongly suspect that then they are quite a different disease, and not syphilitic.

Our next patient is a boy, æt. 13, who is the subject of rheumatic fever. A feature which you will notice about these cases is that the face has a peculiar sodden look, and I take it that that is partly because of the excessive sweating from which the patients suffer. Notice the beads of sweat lying on his face. The great interest lies in our trying to detect whether he has got a murmur. He is said to have a soft systolic murmur, but I cannot detect it now. Murmurs vary very much from time to time in these cases. We want to make out whether the murmur, if there be one, is due to any actual endocarditis or myocarditis. When he came in the apex of the heart was out of position, and the importance of that fact was very great, because it shows that there was some actual cardiac dilatation going on. Whether that is due to any endocarditis or whether it is due to the myocarditis which we now know that people with rheumatic fever get, does not matter from the point of view of treatment, because if you want to save these rheumatic fever cases from getting permanent damage to their heart you must rest them and keep them quiet. If by keeping him at rest in bed we can get the endocarditis or the myocarditis to entirely subside, it makes all the difference between his being a chronic invalid and his being strong and well. The result is well worth fighting for. If there is the slightest suspicion that the heart is affected you should keep the patient in bed for six weeks after the temperature subsides. It is only the same old story: you rest an inflamed part; and there is no case in which rest is more imperative than in the heart disease of rheumatic fever. Another point of interest about him is that he had a sore throat. That is a symptom which is constantly overlooked in rheumatic fever; people do not recognise the importance of the heart trouble and they do not look to the throat. Remember that by recognising the throat trouble early as rheumatic your attention is early directed to the heart, and thus you may be able to save much future trouble.

The next patient is a male child, æt. 3, who came in for diarrhœa and vomiting. He was quite well until three weeks ago, and then he began to have diarrhœa, which was slight at first, but increased later. The stools were light yellow in colour, and the bowels were opened three or four times a day. Last Thursday he began to vomit, and the vomiting became more severe last night. Last Saturday—three days ago—he fell out of bed on the back of his head. He complains of pain in the stomach, and has been crying and restless. He had an eruption round the mouth which has disappeared, and was probably of no consequence. He is a plump and well-nourished child, and as far as we can make out the heart and lungs are healthy. When he sleeps he lies with his head retracted. If he does that invariably it suggests meningitis about the roots of the nerves which supply the muscles that retract the head, especially the first cervical nerve, which is particularly likely to be involved in meningeal exudation about the foramen magnum. In confirmation of that there would be the vomiting. He is stated to have had no temperature, but he was collapsed when he came in. He is now sweating very much. We now wake him up, and find that retraction of the head is not so striking, so it may have been simply the attitude which he assumes in his sleep. What we have to observe is whether that posture is permanent and persistent. But now when I alter the position of his head he does not resist and does not cry out, showing that there is not much rigid contraction of the muscles of the back of the neck. His diarrhœa and vomiting have now stopped. It looks as if the case is not one of very grave importance. The diarrhœa and vomiting may be due to some error of food. But the case serves to remind you of the great importance of retraction of the head as a symptom of meningitis; if, when this child waked up, we had observed that the retraction was always present, and especially if the muscles of the back of the neck had been rigid, so that when the head was passively bent forward there was much

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resistance, and the doing it caused much pain, we should have thought meningitis very probable. As it is, we will carefully watch the case to see if any signs of meningitis show themselves, although it is unlikely that they will, for the retraction of the head is not constant. Inconstant and slight retraction of the head may occur in many infantile conditions, but constant severe retraction of the head is almost certainly due to posterior basic meningitis, almost the only other condition causing it being otitis, and then often the spasm is more marked on one side of the neck than the other.

Here is a man æt. 64. His previous history does not bear upon the case. About three months ago he first noticed pain in the abdomen, which was continuous, but, if anything, increased by food. He also suffered much from flatulence, and the pain was so intense that it prevented him enjoying his food. A fortnight ago he was sick for the first time, and he has been so repeatedly since then, about once a day, four or five hours after taking a meal. He states that he feels sick all day long. His appetite is bad, and he has never had any hæmatemesis nor any early morning vomiting. That is all very important. For the past four months he has noticed that his eyes have been getting jaundiced. They got better for some days and then got yellow again. For the last four months he has had very great difficulty with the bowels, having to take purgatives, and even under their influence he is only able to go to stool once in three or four days. He has been losing flesh considerably, because he at one time weighed thirteen stones. The first thing to notice about him is his jaundice. That is very striking indeed, and it has lasted for some time. What are likely to be the common causes of jaundice that has lasted for four months? The jaundice is so obvious that that is a good way to approach the diagnosis. Undoubtedly cirrhosis is a likely cause, but growth is more likely—a mass of malignant growth in connection with glands in the transverse fissure pressing on the bile-duct. A third possible cause is that it may be a gall-stone impacted in the duct. The fact that the jaundice has lasted four months shows that the cause cannot be any fleeting one, such as catarrhal jaundice. I think we can put aside gall-stones, because he has had no acute pain whatever. Another point is that the liver is not uniformly enlarged, as you might expect it to be if the duct had been blocked by retention of bile. Moreover people who get gall-stones impacted in their bile-duct for four months are generally very ill and they often have rigors. Again, gall-stones set up some inflammation in the duct, and the patient gets infective cholangitis, the symptoms of which are rigors and a high temperature. So, putting aside gall-stones, we have to decide whether in this case the cause of the trouble is cirrhosis or growth. To what points should we direct our attention with the object of settling that? It is suggested that we should take the history. But I think it is wise to take the history last, because patients tell such falsehoods about their drinking habits. The first point, and the most obvious, is as to whether we can feel the liver. If the liver is hobnailed you may know that the trouble is cirrhosis; if you feel lumps on it bigger than a cherry you may know it is growth. As far as we can make out it is not hobnailed. On examining the hepatic region you find it is undoubtedly tender underneath the right rectus, and there is a hard something which you can feel go up and down with your hand; it has a wide excursion. That is just the character which you would expect to find in the case of a man with growth in this part of his liver. What we have thus found out by palpation certainly goes a long way to confirm the suspicion that the cause of his jaundice is some malignant growth, and that it is not cirrhosis. Then I think you will agree with me that the patient does not look like the subject of cirrhosis; his face does not look like it, and he has no ascites, and there is no history of any other symptoms due to intemperance, such as morning vomiting. So the whole of the evidence goes to show that the cause of this long-standing jaundice is pressure on the bile-duct by a mass in the transverse fissure, due to infiltration of the glands with malignant growth secondarily to the mass we feel. The reason we come so rapidly to this conclusion is that we hardly know any other cause for enlargement of glands in the transverse fissure except secondary malignant deposits there. It seems fair to infer that this enlargement of glands in

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the transverse fissure is secondary to malignant disease in the liver. Sometimes, if there are many masses of malignant disease in the liver, it is possible that they, by pressure on various ducts, may cause jaundice, but usually, I think, the jaundice is due to pressure of the enlarged glands, and especially so here, as the liver is not greatly enlarged. This explanation of jaundice in malignant disease of the liver is supported by the fact that you may have many gummata in the liver without jaundice; but then, in the case of gummata of the liver, the glands in the transverse fissure are free. The next question is, Do you think the malignant disease in the liver is primary there, or that it is secondary to malignant disease elsewhere? The chances are twenty-five to one that it is secondary in the liver. If cancer is primary in the liver it is always a very rapid disease, and the end comes in about three months. But this case has progressed four months and the man is pretty well. The next point is as to where the primary malignant disease is most likely to be? I think somewhere in the periphery of the portal vein. The organs in the periphery of the portal vein are the stomach and the gall-bladder, the pancreas and the intestine, and, particularly as far as malignant growth is concerned, the rectum. We may leave out the spleen, as that is so rarely the seat of primary malignant disease.

The probability is that the primary growth is in the pylorus, gall-bladder, pancreas, or rectum. We have examined the rectum, but there is nothing there to indicate any growth, and he has had no bleeding from the anus. There is no mass in the region of the gall-bladder to make us think he has got primary malignant disease there, and there is no history of gall-stone. So we have now left the question of the primary seat being pylorus and the question of its being pancreas. The only way we can settle whether it is in the pancreas is to examine the motions to see if they contain undigested fat. They must be saved and looked at for this. If there is any suspicion that they do contain fat you must look and see if there is muscle-fibre, for when the pancreas is diseased the muscle-fibre in the food remains undigested; and examine the urine and see if it contains sugar, because if the pancreas were completely destroyed there would be sugar in the urine. We have no evidence that it is pancreatic disease, but we have much pointing to the primary seat being in the stomach, namely, that he has had long-continued dyspepsia and vomiting. The great probability is that he has got a primary growth of the stomach, probably carcinoma, and very likely near the pylorus; that he has secondary deposits in the liver, and in the glands of the transverse fissure. What very frequently occurs when you get the pylorus affected is that it becomes adherent to the liver, and you can feel a mass of growth which affects both liver and the adjacent pylorus. It has been suggested that as he complains of a little pain in the legs he has alcoholic neuritis; but this pain is trifling and is probably due to his weakness. The dyspepsia which he complains of is not the dyspepsia of the alcoholic subject. He has not got tenderness in the calves. Also in alcoholic neuritis the knee-jerks disappear early; the knee-jerk has not gone in this case.

This man has been the subject of tubal nephritis, and one of his symptoms is albuminuric retinitis. He has syphilitic choroiditis in one eye and albuminuric retinitis in the other. Recovery from albuminuric retinitis is so rare that you ought not to hold out any hope of recovery to the patient, or at any rate to the friends; it would be raising a false hope. I have seen very few people in whom it has recovered, and they were patients in whom the retinitis was more inflammatory than degenerative, and in them the nephritis was acute. When nephritis is of the chronic interstitial variety the retinitis is more degenerative than inflammatory, and, as you might expect, such retinitis does not recover. When the nephritis is acute the retinitis, being more inflammatory than degenerative, may occasionally recover, but usually it does not. One patient in whom it recovered was a man under my care for acute nephritis and albuminuric retinitis; he came back two years after with chronic nephritis, but his retinitis was quite well. Another was a boy who was in the hospital some two years ago under Dr. Goodhart for acute nephritis; he had albuminuric retinitis and optic neuritis. He came under my care last month and died with a small white kidney; his retinitis had recovered but his neuritis had led to optic

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atrophy. A medical man does not do his duty to his patient who has kidney trouble if he does not examine the eyes. It is very exceptional to find a patient with albuminuric retinitis live longer than two years, and this is especially true in the chronic or degenerative form.

Our next patient is a boy æt. 13, who, six days ago, came home from work feeling very tired and complaining of headache. His mother gave him some Epsom salts. The next day he felt a little better and went to work, but his master sent him home. On Thursday he complained of pain in the head and in the right thigh. On Friday his mother took him to a doctor, who said he thought the boy was going to have rheumatic fever. Then he stopped in bed and seemed to get worse rather than better. On Saturday night he seemed to be delirious and in pain. He was given some medicine by the doctor, but what it was is not known. His headache still continues and he cries out with the pain in his head and thigh. On Sunday he was much the same, and accordingly was brought to the hospital on Sunday night and taken in. On admission his temperature was 102°, his pulse 126, and respiration 35. He is obviously very ill and in great pain. He complained of pain in all his limbs, which he cannot move at all. He is delirious now. His tongue is very dry and furred. His right hip is very tender. His left leg can be flexed, but his right only slightly. He is a typical instance of what is called the typhoid state. He keeps his mouth open and you see the lips are dry; they have sordes on them and the tongue is hard, brown, and dry. There is incontinence of urine and fæces, and you can notice some subsultus, and you can see he is picking at the bedclothes. At the same time you will notice his extreme prostration, his low muttering delirium, associated with mental stupor. These symptoms form what is called the typhoid state, so called because it is seen in cases of typhus, but as that is now so rare in London I think perhaps we most often see the typhoid state in association with severe pyæmic conditions, but we also see it in severe cases of typhoid fever. Considering the great pain, with some swelling in the hip, this must be a case of acute pyæmic inflammation of the right hip, with severe general infection. Such severe cases are fortunately very rare. There is no external wound visible through which the infecting agent, probably streptococci, got into his system; but in some of the worst cases we see of acute pyæmia and of acute osteomyelitis, no site of infection can be found. Now you notice that in him both parotid glands are much swollen; they too are infected and, if he lives long enough, will break down into abscesses. Parotitis due to streptococci is a well-known accompaniment of septic processes, but I have often wondered why, with the many diseases in which the mouth is so filthy, parotitis is so rare. I think this patient should have some antistreptococcic serum. Antistreptococcic serum is only occasionally successful, because the strains of streptococci vary, and if you do not happen to treat the patient with the same strain of streptococci as the patient is suffering from you do not do much good, but it is your duty to try it. When the case was mentioned to me, before I saw it, the question of plague passed through my mind, as we have it in England, and as I was told there was a swelling in the region of the hip, which I thought might be buboes. But we now see that it is not so. This patient is desperately ill, so ill, indeed, that I am surprised he has not had rigors; you will notice that none of his serous membranes are implicated; they are rarely affected in pyæmic processes.

[This patient died about twelve hours after he was seen. There was acute disorganisation of the right hip.]

Cholera Infantum.—Marfan ('Presse médicale') emphasises that cholera infantum is caused by a toxin developing in the milk a few hours after leaving the cow. These toxins form more readily in warm than in cold weather, and are the chief factors of cholera infantum. Marfan advises the sterilisation of the milk after the Soxhlet system—that is, merely boiling the milk within one or two hours after milking, where it can be done. If this is not possible because the milk has to be delivered over great distances, he advises the sterilisation direct at the dairy. Later boiling does not affect the toxin already developed.

The bacterial invasion of the intestinal mucous membrane he considers secondary to the infection. As treatment he removes the child from its milk diet and substitutes pure water with excellent results. He uses approximately the same amount of water in twenty-four hours as that of milk the child had been receiving.—*Interstate Med. Journ.*, October, 1900.

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A SURGICAL CONSULTATION

At the Medical Graduates College and Polyclinic, Chenies Street, W.C., October 17th, 1900,

By JAMES CANTLIE, F.R.C.S.

GENTLEMEN,—The first case is that of an Imperial Yeoman whom Mr. S. Osborne has brought up, and I will ask him to narrate the case to you.

I.—*Gunshot Injury of the Bones of the Leg.*

Mr. S. OSBORNE.—This is a rather interesting case which I picked up on the battlefield in South Africa. The accident occurred on April 25th. The man belongs to the Imperial Yeomanry, and there was a good deal of discussion about him at the time, because it was reported that he had been badly treated by the Boers. When the message came for the ambulance wagon to go out, we were informed that the man had been stripped of every particle of clothing and had been lying in the veldt the whole day without his wounds having been dressed, although he was exposed to the hot sun. Therefore rugs and every necessary were put in the ambulance wagon. When I got there the man thought he would be left out all night. The leg had been very well attended by the Boers, and they had put his limb into the most comfortable position possible. Certainly they had taken his coat off, but only to put it under his head as a pillow. He had been scouting about five miles out, and we brought him into the hospital. He had been shot through both bones of the leg, producing a compound fracture of the left tibia and fibula of a lacerated and very serious character near the left knee-joint, but the joint was not open. He was shot from fifty yards distance. It took a very long time to heal. I have no doubt it was produced by what are called soft-nosed or explosive bullets, though they are not explosive in the ordinary sense. The end of the bullet is either cut off or is split down. I will pass round a set of cartridges which were taken from the bandolier of one of the Boers, and it shows very well the green wax over the end of it, which was at one time thought to be poison purposely applied to the bullet. It is merely wax from a candle melted and dropped down on to the brass. If you scrape that you will find the first layer is perfectly white, but as you get deeper the other layers become more coloured. You can see very well how a conical bullet like this produces a clean wound in comparison with the one I show you, which was taken out of a man's shoulder at the Greek war. You will be able to judge how bad was the wound of this man, and, as I have said, it took a long time for it to heal. It is a fortunate matter that the joint was not perforated, because one finds the wound of exit of these soft-nosed bullets very large indeed. I hoped to have another man here to-day, but he could not come up. He had a wound in the left arm, just above the elbow, and the small wound of entrance was very typical, but the exit was a very much pulverised wound of a size large enough to admit the bottom of a teacup. You will see by looking at this man's knee that his wound was probably caused by the soft-nosed bullet. Here is another bullet which I cut out of one of the Frenchmen who was serving with General Villebois Mauriel when that general was killed. There is no doubt that it was fired from an English revolver, because it is of a different shape to one fired from a gun. Our patient's fracture was healed up well by the early part of June, and he was invalided from Kimberley about the end of June to Wynberg Hospital, and he left the Cape on June 24th. That brings us to the present state of affairs. He is now having massage, under Dr. Little, at Great Portland Street, and he already feels considerable benefit from it. But there is a tender spot where the fracture occurred, but what it is due to I am not certain. My view is that there may be some deep-seated abscess, which we shall probably have to cut down upon and evacuate. The man is a little bit anxious, and it has been suggested that he should have the X rays applied to his leg. There is some atrophy of the muscles of his leg.

II.—*Dislocation of the Outer End of Clavicle.*

Mr. CANTLIE.—Here is a man, a plasterer by trade, who has a very common, and what appears to be a slight, ailment, but it is enough to prevent him following his occupation. Three weeks ago he fell on his head and right shoulder from a height. Since the fall he has had a swelling over the right acromion, which is very tender. There is no proof that he has had a

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fracture there, for Dr. Low, whose patient this man is, has very considerately sent two skiagrams, one showing the healthy and the other the injured side. Seen from the back there is on the right or injured side a considerably larger gap between the clavicle and the acromion than on the left side; that might be explained by the angle at which the man was standing, for there is apt to be a certain amount of fallacy in almost all skiagrams. There does not appear to be fracture, but a slight displacement, and on the right the clavicle is seen to be higher in relation to the adjacent acromion than on the left side. That is all we can make out from the skiagram, or from an examination of the shoulder. As you are aware, this is a very common accident; but in spite of our familiarity with the displacement, we have not advanced in our knowledge of how to treat it, so as to allow the patient to return to his employment at an early date. There is a tendency in these cases, due to the obliquity of the articulation between the clavicle and the acromion, for the clavicle to slip on to the acromion process. The dislocation is termed one of the outer end of the clavicle upwards, or, more frequently, of the acromion downwards. The preservation of the integrity of the articulation depends on the strong ligament above the joint—the superior acromio-clavicular ligament,—and if that ligament is torn, a complete or partial dislocation is the result.

The diagnosis of this condition is not difficult, the reduction of the dislocation is usually quite easy, but the subsequent attempts to keep the bones of the articulation in their places is always disappointing. This is accounted for by the direction of the obliquity of the articular surfaces, the clavicle tending to slip up on to the acromion.

The treatment of the condition is, usually, to extend the shoulders, apply a pad and bandage over the dislocated end of the clavicle, and to place the arm in a sling. This is easy of accomplishment, and the slightness of the displacement and the ease of reduction would seem to present little difficulty. When, however, the pad and bandage are removed, say at the end of two, three, or four weeks, and the limb moved, the clavicle will still be found riding on the acromion as prominently, it may be, as when the dislocation was first seen. The question arises, what is then to be done? The deformity is present, and the power of the limb is considerably impaired. It is useless to apply pads and bandages, etc., in the hopes of improvement; the longer they are kept on the weaker will the joint become. In the natural state the articulation depends for its strength upon the superior acromio-clavicular ligament, and as this is torn during displacement, the rational treatment would appear to be to regenerate the ligament. This cannot be done by pads, or by rest, but by movement, so that the irritation kept up may induce an inflammatory thickening of the ligaments around the joint. The displacement and disfigurement will never quite disappear, and the practitioner will be wise to warn the patient of this fact at an early period in the treatment of the case.

My recommendation is to keep the shoulders back, and the limb of the affected side at rest in a sling for eight or ten days; and after that interval to allow of movement with the idea of causing thickening of the ligaments above the articulation. With or without a skiagram, it is difficult at times to diagnose whether a fracture or a dislocation has occurred.

The fractures in this region are—(*a*) Fracture of the outer end of the clavicle between the attachments of the coraco-clavicular ligaments and the acromio-clavicular articulation—what is termed an extra-ligamentous fracture; and (*b*) a fracture of the acromion process itself. The diagnosis of the latter is at times mistaken for separation of the acromial epiphysis. In this situation are three epiphyses which do not unite with the spine of the scapula until about the twenty-first year, and in place of a bony union taking place, a fibrous union only is found. This, by a skiagram, would give the appearance of a fracture, and the diagnosis suggested would have to be corrected by careful anatomical inspection, and by measurements.

I should like to ask any of the medical men present to express their opinion and state their experience concerning the treatment of dislocation at the outer end of the clavicle upwards.

Dr. HENDERSON, of Shanghai, said he had a fall from a horse on to the left shoulder from which he suffered very great pain. He kept the arm in a sling for two weeks, and after that he

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began to use it, and tried to bend it back, but at first could not do so. Ultimately, he got a good shoulder, and he could now use it for all ordinary purposes. He believed the sooner the man attempted movement systematically the better.

III.—*Tumour of the Upper Jaw.*

The next case I wish to draw your attention to is that of an old lady æt. 74, who comes with a tumour of the right maxilla, and it is so large that the disfigurement is very plain from a distance. She has noticed it for twelve months and it does not give constant pain, but when it does become painful it affects her whole head as well as her jaw. There is no history of discharge from the nose. It has been noticed to increase in size during the past week. You will notice that the bulging reaches as high as the malar bone will permit it to go. The right nostril feels as if it were expanded, but she cannot blow through it very well. The tumour seems to have originated within the antrum of Highmore. There are no enlarged glands to be felt. There is nothing to be seen in the palate, but there is a boggy feel on the anterior aspect of the maxilla, and it feels as though the bone in this region was completely absorbed; were it merely expanding we should be able to obtain an eggshell crackling, which, however, is not present. Had this been a cystic tumour the development would have been slower, and it would have "pointed" more sharply on the facial aspect than it has. The tumour is evidently not osteomatous, nor has it any of the features of a collection of pus. It is evidently a sarcoma we have to deal with. Sarcomata growing from the cavity of the upper jaw are usually of the round- or small spindle-celled variety; when they grow from the anterior aspect of the bone they are generally of the nature of melanotic tumours; when from the zygomatic surface they are usually found to be of the large spindle-celled variety. I would now ask you what you would propose to do. Now should the upper jaw be excised? In favour of such a step the patient seems to be in good health, and the tumour appears limited to the upper jaw. Against the expediency of removal we have the age of the patient, the fact that unless the malignant growth can be completely eradicated that active recurrence is certain to take place, and also that in very old people malignant growths, certainly of a cancerous nature, but even of a sarcomatous type, are wont to be slow in their development, and that life may be prolonged rather by leaving them alone than by surgical operation.

Mr. CANTLIE advised that the tumour, considering the age of the patient, should be left alone, an opinion confirmed by the forty or fifty medical men present.

IV.—*General Enlargement of the Foot.*

This man, about fifty years of age, comes up from the Seamen's Hospital at the Albert Docks. Two and a half years ago he had a swelling of his foot which lasted fourteen days, but for which he could not assign a cause. At that time he was on board ship, but was not under a doctor's care. Recently it has got big again—that is to say some four weeks ago,—and he has been under observation three weeks. The whole foot is enlarged with the exception of the toes. There is but little œdema, and there is not much pain. The enlargement is uniform, the bony landmarks of the foot are obliterated, and the whole feels solid and hard as if from expanded bones. I have some skiagrams of the foot to show you. It looks from the skiagrams as if there is a growth causing an interval between the first and second toes. One of the skiagrams shows the internal cuneiform bone displaced inwards, and it looks as if there is a growth burrowing its way between the bones. There is a gap between the first and second metatarsals. I am not at all certain about the diagnosis. Of course it might be a universal caries of the tarsus and metatarsus of tubercular origin; it might be sarcomatous. Lipoma might produce a general enlargement of the foot, but lipoma usually grows from the sole of the foot and does not affect the dorsum so symmetrically. It has somewhat the appearance of a "Madura foot," a condition caused by infiltration of the tissues of the foot by the ova of the ray fungus of the mycetomatous parasite, and as the patient is a sailor, it is possible he may have contracted this disease on the Indian coasts. Although there is a slight scar and depression on the dorsum of the foot, there are no sinuses, a condition which fairly conclusively sets aside the diagnosis of mycetoma. I have put the patient on iodide of potassium in

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the hopes of eliminating a syphilitic origin to the disease, and a little improvement has taken place. Captain Pinch stated that he did not consider the case to be one of mycetoma.

V.—*Dislocation of the whole Metatarsus outwards.*

A lateral displacement of this nature without fracture is very rare. The skiagrams I have show the second metatarsal bone torn from its tarsal connections, and a green-stick fracture of the second metatarsal bone near the centre of its shaft. Now and again a doubtful crepitus was felt, but it seemed to be rather a cartilaginous rub than a true bone crepitus. I kept the foot at rest for twelve days and then, under chloroform, put my knee against the inside of his tarsus and tried to replace the metatarsus; but my efforts, altogether futile to reduce the deformity to any great extent, allowed more freedom of movement to the whole foot.

VI.—*Stricture of the Œsophagus.*

This is a lad æt. 19, with stricture of the œsophagus at its lower end. You will see he looks very weak and anæmic, but he is much better than he was. When he came under treatment at the Seamen's Hospital he could swallow milk only with very great difficulty; indeed, he was afraid to swallow anything. When he went into hospital he was treated with the usual bougies. He was in the General Hospital at Montreal for gastric ulcer. Shortly before his intended discharge from that hospital he was seized with violent vomiting and hæmatemesis. The vomit was highly acid and very copious, from twenty-three to thirty ounces at a time, and showed the presence of micro- and macro-organisms. The pain and vomiting continued until the stomach was washed out. During the passage of the tube of the stomach pump it was noticed that great pain was felt about three inches above the œsophageal orifice of the stomach, and this became so severe that it was necessary to stop passing the tube. In January, 1900, he had difficulty in swallowing food, and had regurgitation of food from half an hour to one hour after eating. The bougie which was passed was seized four inches above the cardiac orifice, and only a small-sized bougie could be passed. The lumen was increased by the bougie, but deglutition was no better, and the anæmia and emaciation were very marked. In March, 1900, the stomach was opened, and the œsophagus was dilated by Loreta's method, but the temperature rose so high that the bougie had to be withdrawn and the wound was allowed to heal. He came into the Seamen's Hospital with a recurrence of all his symptoms, and since admission bougies have been passed, with the result that, though he is still anæmic, he can now eat fish and take milk. Curiously enough, he finds most difficulty with fatty foods. Sometimes there is pain now when the bougie is passed, but it is referred to the site of the wound in the stomach; whereas before he was operated upon he had a pain higher up in the chest. Sometimes he has had headaches, but he sleeps well. It is very rarely we see stricture of the œsophagus in one so young, and very rarely is it non-malignant. There is no doubt the patient has a gastric ulcer situated close to the œsophageal opening. He passes the bougie twice a week.

VII.—*A Liver Abscess.*

I have brought for your inspection a liver, showing an abscess, and the intestine of the same patient, showing ulcers. The specimens were obtained from the body of a native of the West Coast of Africa, who came to the Seamen's Hospital. He was in a very collapsed state on admission, but by careful attention he was revived considerably, and it was discovered that he had the signs and symptoms of a large abscess in his liver, and in twenty-four hours he was in such a condition that it was possible the abscess was pointing in the epigastrium, and the symptoms were so urgent that it was thought advisable to operate speedily. I got down upon the pus by Manson's trocar and cannula, and drew off some eighteen ounces. A large quantity of pus flowed away through the drainage-tube during the next day or two; but the man did not seem to get any reaction, and sank on the third day after the operation. *Post mortem* we discovered a double abscess in the right lobe with a protrusion between the two. We were able to satisfy ourselves that at the operation we had reached both abscesses, and I show you the passage made by the trocar. The right lobe of his liver was reduced to a mere shell, and the left lobe was hyper-

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trophied. In the cæcum a large ulcerative surface, covered as though by a diphtheritic membrane, was found. This condition must be described as a multiple abscess of the liver consequent upon a dysenteric ulcer in the bowel, a condition which Murchison thought to be a constant feature of multiple hepatic abscesses. A single tropical abscess of the liver need not be dysenteric. Murchison said that, given an ulceration of the intestine, you get multiple abscess in the liver; but I do not think Murchison's dictum is borne out by experience.

The method by which Dr. Manson practises this operation I will mention shortly. If there be an abscess far back in the liver, search for the pus by an aspirating needle, and then draw it off by a trocar and cannula. If it is far back you find a laparotomy from the anterior aspect does not help you. At the meeting of the Tropical Section of the British Medical Association, when operations for hepatic abscess were discussed, none present advocated laparotomy, all were in favour of tapping through a large tube. Colonel Kenneth Macleod mentioned the case of a surgeon who, after cutting down on the liver, could not see any trace of an abscess, yet within a few days a large quantity of hepatic pus was passed by the rectum. It is upheld by some surgeons that it is much more satisfactory to cut down upon the abscess to see what you are doing, but I do not see that exposure of the liver furthers the operation in any degree whatever, more especially when the abscess is supra-hepatic or when it is deeply seated in the liver substance. I have employed Dr. Manson's plan of treatment for many years, and with gratifying results.

Mr. CANTLIE then demonstrated his own instruments and those of Dr. Patrick Manson, and their mode of application was lucidly demonstrated on a large water-melon.

Dr. MACLEOD, of Shanghai, at Mr. Cantlie's request, gave a demonstration of his method of operating for liver abscess, and ably advocated the use of a jointed silver drainage-tube in preference to the rubber drain employed by Dr. Manson and Mr. Cantlie.

CLINICAL LECTURES

ON

THE VARIOUS FORMS OF INTRA-ABDOMINAL SUPPURATION.

Delivered at Westminster Hospital

By A. H. TUBBY, M.S., F.R.C.S.,

Surgeon to the Hospital.

LECTURE III.

GENTLEMEN,—In the second lecture we spoke of the diagnosis of pus, and we have now to consider the advent of general purulent peritonitis. It is not at all an uncommon event for acute general peritonitis to occur as the result of appendicitis; in fact, one may say that in childhood the most common cause of general peritonitis is appendicitis. As a rule, it is associated with perforation of the appendix, with gangrene, or the bursting of a cyst,—that is, with the more acute forms of appendicitis, and not the lesser, such as the catarrhal form. Again, it may happen that an appendicitis case is apparently doing fairly well, and then an intra-abdominal abscess or localised appendicular abscess suddenly bursts into the general peritoneal cavity, and foul pus is let loose, so that there ensues an acute general peritonitis of an especially virulent character.

An interesting variety of appendicitis is the recurrent. The distinction between recurrent and relapsing appendicitis has already been made in the previous lecture.

As an example of recurrent appendicitis I may allude to the case I saw this morning of a little girl whose appendix I removed last summer. She had had five attacks, but she had been fairly well in the intervals. After operating I found a striking state of affairs. When I opened the appendix, an ulcer of the appendix was seen, and the floor of it was formed by the peritoneum only, so that she was within measurable distance of very grave danger. Her case was recurrent appendicitis. Relapsing appendicitis is that in which the patient is never well between the attacks, but passes on from one attack to the other, without being in health at all between the attacks. It is very interesting to note the frequency with

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which these cases recur. If five persons have each had one attack of appendicitis, the probability is that one out of the five will have further attacks; that is to say, the frequency of recurrences is one in five. This is a very important thing to bear in mind when considering the question of operation and removal of the appendix, and you may be certain that one of five will have relapses.

The symptoms of recurrent attacks are similar to those of other forms, because it stands to reason that the recurrent attack may take on any one of the forms which are met with in primary attacks; that is to say, it may be catarrhal, phlegmonous, suppurative, or the acute form of general peritonitis. It is important to know how you can ascertain whether a patient has an appendix which is in such a condition that you fear a recurrence, and Edebohl has found a sign; he has shown that, given certain favourable conditions, it is possible to palpate the diseased appendix. He directs that the patient should lie on his back, with his knees raised, his head well up, his mouth open, and should take a deep breath; then you should feel very carefully the outer margin of the right rectus and sink the fingers in deeply towards the iliac crest. In many cases you will feel a thickened cord running along a line between the anterior superior spine and the umbilicus. If you roll that cord under the finger you can make tolerably certain it is a thickened appendix. Of course there are certain fallacies to be avoided; and one of them is that it may be the thickened tendinous cord of the psoas minor you feel. Another is that it may be the contracted muscular fibres of the internal oblique; or it may be an indurated omentum, or enlarged glands. But as a rule it is not difficult to ascertain the presence of this thickened appendix.

Appendicitis in childhood is very frequent indeed, far more so in childhood and adolescence than in the adult. In children it is very commonly mistaken for some other disease, *e. g.* for dyspepsia or bladder trouble, and it may happen, as is often the case, that the appendix is hanging down in the pelvis and the child has symptoms of incontinence or difficulty of urination. It is these symptoms which lead to the idea that it is bladder trouble. Unfortunately the condition is sometimes aggravated by purgatives. Often, if there be pain in the right iliac region, the conclusion is hastily arrived at that the child has been over-eating, and purgatives are accordingly promptly given, with the result that the child soon has an acute general peritonitis. If you can exclude other conditions you may be safe in saying you are dealing with acute appendicitis. It often happens that vomiting is absent in children, and the signs of the disease are by no means so distinct; but there is one satisfactory fact about appendicitis in childhood, namely, that the worst cases in children recover more readily than they do in adults.

I next propose to deal with the complications, sequelæ, and diagnosis of appendicitis. Amongst the *complications* the most common is intestinal obstruction. I said the cardinal symptoms of appendicitis are pain, constipation, and vomiting. It therefore follows that in all cases of appendicitis there is always a very mild degree of intestinal obstruction,—not true intestinal obstruction, but rather a condition of impaction of the bowel contents. In a considerable number of cases it happens that the intestinal obstruction assumes a more severe form. For instance, there may be absolute obstruction. What is the cause of it? You will understand that there being an inflammation of the right iliac fossa extending upwards towards the kidney, and downwards towards the pelvis, a large number of coils of bowel must become adherent, and these coils become kinked, so that there is a definite physical obstruction to the passage of the bowel contents, and the bowel itself may be bound down in a large inflammatory mass, hence the intestinal obstruction. I can remember very well ten years ago being called down to a suburb near London to see a little child. The history was that in the afternoon of two days previously, the weather being very hot, he had gone downstairs and drunk a large quantity of cold water, and then had been seized with acute iliac pain. When I saw him the whole abdomen was blown up, and it was apparently a case of virulent peritonitis. But bearing in mind former experiences of acute appendicitis in children, I opened the abdomen in the right iliac region, and was fortunate enough to evacuate a large abscess. It was an intensely septic case. For a time all went well; but

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eight days afterwards I was called again to see the child, and found that he had symptoms of intestinal obstruction. I felt it was no good to make a second exploration of the iliac region. so I made an incision in the middle line and examined the condition of the intestines. What had happened was that inflammation had spread, and the intestines were bound up in one great solid mass of adhesions. It was evident that the intestines were being slowly contracted by these bands of adhesion, and one could not hope to get any good result, so I formed an artificial anus, but the child died two days afterwards, and the only benefit of the second operation was that he died in little pain instead of agony.

Other complications are pylephlebitis, that is inflammation, septic or otherwise, of the radicles of the portal vein, hepatic abscess, and pyæmia. A good many cases have these complications. The radicles of the portal vein are often blocked up by large numbers of septic emboli which have come there from the mesenteric vein, and then abscesses are formed, not the usual single abscess of dysentery, but the multiple abscesses of pyæmia, and there is no doubt, as I have mentioned, the cause is a septic thrombosis of the radicles of the superior mesenteric vein from a necrotic or gangrenous appendix. Now you can never be quite certain, even when you have opened the abdominal cavity itself, on feeling the appendix what its exact condition is. It often happens that an appendix which is apparently healthy to the touch, when it is removed and slit open is found to have in its walls a septic ulcer; and it is curious to note that not always is the lesion apparent on the surface; you must make a section through the appendix itself in various directions to find it. You will sometimes see beneath the mucous membrane a localised abscess in the submucosa. Therefore you must never allow yourself to be deceived by an apparently healthy appendix, but you should take care to remove it and make sections of it in various directions. A case I remember was where the abdomen was opened, the appendix looked for and found. It was thought to be quite healthy, was accordingly dropped back into the pelvis, and the wound closed. The patient died of hepatic abscess and pyæmia, and at the post-mortem the appendix was examined, and a localised necrotic patch was discovered between the mucous membrane and the peritoneum.

Another complication is pleurisy or empyema, which is usually right-sided; and it is interesting that in most of these cases of abscesses in the pleural cavity associated with appendicitis you find ample evidences of the *Bacillus coli communis* in the pus. I have mentioned also in a previous lecture that in a cerebral abscess associated with pyæmia from appendicitis you find the *Bacillus coli communis*. Appendicitis is the most common cause of subdiaphragmatic abscess. Thrombosis of the right iliac vein and œdema of the leg are seen in appendicitis; and some people are disposed to think that these arise from septic plugging, but I do not think it is so; it is usually due to weakness. An interesting and fatal result arising from it is pulmonary embolism.

In operating for appendicitis, hæmorrhage occurs, and it is usually venous, being due to softening of the veins from septic infiltration of their walls. It usually comes from the deep circumflex iliac vein, or from the common iliac vein. When it comes from the former it is easily controlled, as in the case we had last week; but if it is from one of the iliac veins it is a very difficult matter indeed to arrest it. Therefore it may be readily understood that hæmorrhage from the deep circumflex iliac vein is of no danger; but if it be from the internal or external or common, it is very grievous and dangerous, and a complication which is frequently fatal.

Perforation of the cæcum—that is to say, an ulcerative or necrotic process of the appendix spreading to the cæcum and causing its perforation—is met with. Many appendicular inflammations spread to the psoas and iliacus muscles producing myositis, and there is flexion of the thigh, which is an important point in diagnosis, because it frequently occurs in children with appendicitis, and hence may give rise to the idea that you are dealing with a case of hip-joint disease. If an attack of appendicitis occur during pregnancy it makes the prognosis much more grave, and for this reason,—that the cases tend to assume rapidly a severe form. In appendicitis associated with pregnancy the proportion of acute general peritonitis is much greater than in cases not so associated. And not

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only so, but appendicitis induces abortion and miscarriage, and therefore in that way adds to the gravity of the case.

A frequent complication of appendicitis is intestinal fistula, which may discharge itself either externally or internally. The cause of the fistula may be imperfect ligature of the appendix while removing it, or a perforation in the cæcum, the opening of which remains patent and fæces come through; or the cæcum may be gangrenous in spots, so that you see it is very easy for fæces to make their way out from the intestine. The position which the fistula assumes varies. Sometimes it is abdominal, or it opens in the gluteal region, or in the thigh, at the outer aspect. You can, as a rule, recognise it by the smell of the fæces and the foul pus. In the patient in Queen Anne Ward there is a fæcal fistula in the loin, which is due to the pointing of a perinephritic appendicular abscess with discharge of fæcal pus.

Metastatic parotitis occurs in the course of some attacks. I do not know whether you are acquainted with this affection, but it may happen in the course of acute abdominal inflammations there is suppuration of the parotid glands after enlargement of them. It is distinguished from mumps by the fact that in the latter the parotid glands are enlarged but do not suppurate. You will meet this curious complication of metastatic parotitis in about five of one hundred cases of appendicitis. I remember reading the details of the illness of General Garfield, President of the United States, and being very much struck by the onset of this complication. You will remember he was shot in the back. He struggled on for many weeks and finally died. In the last week or two of his life he had an acute attack of metastatic parotitis. He died very suddenly after very acute pain, and post-mortem examination showed that the bullet which entered his back had bruised the inferior mesenteric artery, and the cause of death was hæmorrhage from the inferior mesenteric artery into the general peritoneal cavity. For thirteen weeks he had a discharging sinus in the back, leading down to the artery.

We now come to *diagnosis*. If the disease follow the text-book description the diagnosis is fairly easy; and so is the recognition of all diseases. Text-books are written as catalogues, but do not teach you the habit of diagnosis. It is important to bear in mind that there are, in most attacks of appendicitis, certain cardinal symptoms. These are a sudden onset, rapid rise of temperature, quick pulse, acute pain, vomiting, nausea, constipation, local tenderness, and swelling. But, as I shall show you presently, the disease is not always so typical, because the position of the pain may vary very much. It depends on the length of the appendix. If it be so long that it hangs down in the pelvis there is pelvic pain; or if it travel about and point toward the kidneys, the pain is renal; and if the appendix lie across the middle line the pain is on the left side. Moreover, if there is a long appendix, one part of it may be diseased and the other not. That also determines the position of the pain. There are some very severe cases of acute appendicitis in which there is no pain whatever. The explanation is rather striking. In these cases the appendix has been found to be absolutely gangrenous, —that is to say, the appendix and its nerves are dead. Mr. Treves records one case of a man who looked very ill, but said he did not feel so. He was lying in bed, and said, "I have no pain at all," and freely slapped the right iliac fossa. He died in four or five hours, and at the post-mortem examination it was found that he had a gangrenous appendix. Sometimes it happens that the localised abdominal swelling is absent. For instance, when an appendix hangs in the pelvis, swelling can only be felt *per rectum*. As a rule, right iliac tenderness is fairly common in men and women, but in the latter it has not the same diagnostic significance because it may be due to a right-sided ovaritis or salpingitis.

Now we come to questions which must present themselves to anybody treating appendicitis. Is it possible at the beginning of an attack to be sure of what kind of attack you are dealing with? One may say absolutely that no one can be sure during the first twenty-four hours. You may know that you have before you either catarrhal phlegmonous, or suppurative appendicitis, or acute peritonitis, but you cannot be sure of the exact form. Some attacks begin very acutely and subside equally rapidly; others go on for a time and increase in intensity, and then subside; others increase in intensity and do not subside at all, but pass on to acute peritonitis. Yet it may

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be said that the character of the attack is fairly certain by the third or fourth day. However certain you may be that the attack you are dealing with is of a mild type, peritonitis may set in and the patient die in twenty-four hours. "There is no disease so protean in its nature and so uncertain as appendicitis." Secondly, will an appendix perforate? You can hazard an opinion on this point generally on the third or fourth day. If the frequency of the pulse is out of all proportion to the fever, if the pain is severe and lasting, if there is a large swelling rapidly formed, and if there is continuous vomiting, you are dealing not with an ordinary case of catarrhal appendicitis, but with one of perforative appendicitis; and you know that either a cyst has burst or that a necrosed or ulcerated patch has given way, and the contents of a septic appendix have made their way into the abdominal cavity. It may be that the contents will become localised, or that the contents will become diffused all over the abdomen. Can pus be diagnosed? In a previous lecture I gave you seven or eight points upon which you should rely for the diagnosis of pus. Can you tell when acute peritonitis is setting in? You may look upon every case of appendicitis as a potential case of acute peritonitis. You must watch your cases carefully for signs of pus, and be prepared to open the abdomen at any moment. The only course in a case which is not going satisfactorily is to call in a surgeon to operate at once. In fact, I do not think appendicitis should be regarded in the first place as a medical disease; it is to all intents and purposes a surgical disease, but the position of the surgeon in regard to it is rather unfortunate. He has to wait until the physician thinks it is right to send for him, and then he is called in to operate at once. My contention is that the man who has to operate is the man who knows *when* to operate. In these abdominal cases it is a matter of hours, not days.

We now come to the *differential diagnosis*. It is necessary to diagnose appendicitis first of all from acute intestinal obstruction. Acute intestinal obstruction may be due to bands and many other causes. In acute obstruction of the small intestine, in which it is suddenly nipped by a band, there is always at the onset of the obstruction greater collapse, the pain is more severe in the umbilical region, and is not localised subsequently to the right iliac fossa. Again, constipation is absolute from the first. The abdomen becomes distended earlier than in appendicitis, and it often happens that the temperature is lowered rather than raised. One may say as a broad rule that appendicitis is more often mistaken for intestinal obstruction than intestinal obstruction is mistaken for it. Most cases presenting acute abdominal symptoms are appendicular rather than obstructive, with one exception, namely, volvulus. Volvulus, which is a twist of the intestine, especially of the large, comes on with acute fulminating symptoms. Very often you can clear up the diagnosis by examining the rectum. I would say, as a golden rule, in every case of abdominal mischief examine *per rectum*.

Another condition is intussusception. It occurs frequently in children. It has a rapid and sudden onset; it is usually in the right iliac fossa, and a swelling is found. So it very often happens that it is difficult to diagnose between appendicitis and intussusception. But in intussusception the rise in temperature is, as a rule, very slight, and very often it is not raised at all, but is lowered. Further, in intussusception the pain is not constant, but is intermittent, and is relieved by pressure. In the next place, in intussusception the character of the tumour is perfectly well marked. It is sausage-shaped, it moves from the right iliac fossa towards the hepatic flexure of the colon. Further, if you keep your hand carefully on such a tumour you feel the tumour harden suddenly when the patient is in pain. In intussusception there is a discharge of blood and mucus from the bowel. Of course if it is a clear, straightforward case one ought not to mistake intussusception for appendicitis. In treatment, if there is doubt, operation is called for.

Then you must distinguish appendicitis from renal and biliary colic. Why should they be mistaken? Because, as I have insisted, the appendix may take the direction of the kidney or the liver, and its end may suppurate or slough, and abscess form in the neighbourhood of the kidney and liver, the pain from which simulates very closely renal or biliary colic.

Appendicitis is mistaken for perforating gastric ulcer; and for this reason, that in both affections the onset is very sudden, with pain, and there is a certain amount of vomiting. But in perforating

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gastric ulcer you will note that the pain and distension are greater at the upper part of the abdomen, and the liver dulness has, in most cases, disappeared, owing to there being air in the abdominal cavity; and you can obtain from the patient a fairly typical history of dyspepsia and hæmatemesis. The most important sign of gastric ulcer is the disappearance of the liver dulness.

Then there is malignant disease of the cæcum which may be mistaken for appendicitis, but as a rule the diagnosis of this condition is not difficult unless the growth has perforated the cæcum, and pus has formed around as the result of extravasation of fæces.

Typhoid fever is often confused with appendicitis. If the typhoid fever be typical, and the appendicitis likewise, there should be no mistake, but neither disease is in any sense constant; in fact both diseases present many phases; so that one may say it is easy for a mistake to occur. But treatment in the early stages is the same, namely, rest in bed, abstention from solid food and purgatives. Therefore if you watch the case and be on your guard you cannot very well bring your patient to much harm. There is one point which might help you, namely, Widal's reaction of the blood in typhoid fever. Another point is that in appendicitis with pus there is excessive leucocytosis of the blood; whereas such does not occur in typhoid fever.

Membranous colitis may be mistaken for appendicitis because of the pain; but in membranous colitis there are discharges from the rectum, casts from the colon, and blood in the stools, which do not occur in appendicitis.

Tubercular peritonitis is sometimes taken for appendicitis, especially if it be on the right side and pus forms in an indurated mass of tubercular omentum in the iliac fossa.

Certain affections of the pelvic viscera and peritoneum are confused with appendicitis; that is to say, a right-sided ovaritis or a right pyosalpinx may be thought to be appendicitis. Or a lumbar and a perinephritic abscess may simulate it, and so may hip-joint disease. In the latter there is contraction of the psoas muscle and of the iliacus.

Relations of Infantile Spinal Paralysis to Spinal Diseases of Later Life.—William Hirsch ('Journ. of Nervous and Mental Dis.,' May) writes that various theories have been offered as to the nosological relation between the early infantile paralysis and the later disease. According to some authors irritation of the cord enfeebled this organ, and made it a *locus minoris resistentiæ*, which on any occasion might become susceptible to further disease. Charcot expressed the opinion that there existed in some individuals a certain disposition, a kind of vulnerability of the ganglionic cells of the anterior horns, which at some period of life might give rise to an acute poliomyelitis anterior, and at another to a progressive muscular atrophy. A third view was that the old scar which was produced by the inflammatory process in the grey matter of the anterior horns formed a latent but permanent inflammatory focus, which at any time might light up afresh and cause a new set of symptoms. Recent anatomical investigations of fresh cases of infantile spinal paralysis, as well as the generally accepted theory of its infectious nature, have put it beyond doubt that we have to deal, not with a systematic disease, but with an interstitial inflammatory process. As far as spinal diseases of later life are concerned, we must admit that in many cases it is not only extremely difficult, but sometimes quite impossible, to distinguish between a systemic or neuron disease and a myelitis merely from the clinical symptoms. The author is inclined to believe that quite a number of cases reported as having developed from an infantile spinal paralysis to a progressive muscular atrophy would prove, after microscopical examination, to be instances of myelitis instead of primary neuron disease. The question arises as to whether a man's infantile paralysis has any relation to his later disease, and, if so, of what nature is this relation? Most theories are based on the theory that poliomyelitis anterior is a systematic disease, and could not therefore be applied to such a case. The third theory mentioned, however, would correspond to the clinical and anatomical conditions of such a case; that is, that the old scar which was produced by the inflammatory process in the gray matter of the anterior horns formed a latent but permant inflammatory focus which at any time might light up afresh and cause a new set of symptoms. Whether the old scar contained the poison to set up the new disease, or whether we have to deal with a new infection which attacked the old scar first is, of course, a question which cannot be decided with absolute certainty.—*Amer. Journ. of Obstet.*, October, 1900.

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BIAS IN CLINICAL MEDICINE.*

By JUDSON S. BURY, M.D.Lond., F.R.C.P.,
Physician to the Manchester Royal Infirmary.

"Alas, what years you thus consume in vain
Ruled by this wretched bias of the brain."
Crabbe.

MR. PRESIDENT, LADIES AND GENTLEMEN,—In seeking for a subject the consideration of which would be interesting as well as helpful to you in your daily hospital work, my thoughts took the following direction:—As students and doctors one of our main duties is the examination of patients. Do we always do this in a satisfactory way? My experience answered, "No; there is need for more care, the examination is too often carried out in a perfunctory manner." For example, we find bronchitis, and think that this is a complete diagnosis, but we have omitted to consider the aching pain through the left side of the chest, which the patient has mentioned several times, and which, as the post-mortem shows, was due to an aneurysm of the descending portion of the aorta. The bias of bronchitis had entered the mind, and its door was closed to the consideration of other possibilities. Similar instances of errors due to bias occurred to me, and I thought that it might be profitable to consider some of its chief varieties and to discuss its causes and cure. The word bias appears to come from an old French word *biais*, meaning oblique or slanting. As a rule it is used to denote a swaying influence, a one-sided tendency of the mind. It is to be observed that the term usually implies error; thus when we say the judgment is biassed, we mean that it is at fault; when the judgment or opinion is correct, we say that it is good or sound, not often that it is biassed in a right direction. The customary use of the word is, then, in accordance with its original meaning, namely, oblique; we say that a person looks at things in a biassed fashion or obliquely. In ex-

* An address delivered to the University College Medical Society, October 17th, 1900.

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treme cases the deviation becomes an actual distortion, and the afflicted person may be said to possess what Oliver Wendell Holmes called a squinting brain.

The causes of bias.—How is it that so many of us are apt to look at things obliquely, that our minds become fixed in one direction and, often unconsciously to ourselves, become closed to the consideration of more than one or two aspects of a question? The causes of this one-sided tendency are partly congenital and partly acquired.

Congenital bias.—Some persons appear to be devoid of any power of observation; they see things but cannot observe, and are unable to analyse and form a judgment on the various impressions received by their eyes, ears, and other organs of special sense. Advanced cases of this type exhibit a decided repugnance to scientific investigation, and it is a great misfortune when a youth who has shown this peculiar mental blindness finds his way into the wards of a hospital, for he rarely makes much headway with practical medicine. He may be clever in other directions, thus he may show strong artistic or dramatic tendencies, but he appears to have no idea how to proceed when asked to examine a patient. He seems to regard the patient as a strange foreign animal, and exhibits a distinct mental bias against approaching him too closely, as if he instinctively felt that he was unfit for the work. If persuaded to go nearer to the patient, with a view to the investigation of the case, and you prompt him with certain questions to ask the patient, he asks the questions and, although intelligent answers are given him, they do not seem to give his brain any guidance as to the mode of procedure. Often this type of student shows irritability in respect to the answers received, and repeats his questions with increasing loudness of voice, as if he thought the patient ought to reveal to him the whole pathology of his case. If the patient complains of pain in the side, the student referred to may examine the painful part and push his fingers rather vigorously in several places. Should the patient wince and exhibit distress, he stops his examination, looks bewildered, and does not know what further to do. Education may do something for this type of student, but the mental bias against scientific methods is too strong for much success to be attained, and it would be well for him to devote his abilities in directions for which they are naturally more fitted. Less aggravated varieties of this congenital type are not uncommon, indeed it is perhaps rare to meet with a naturally good scientific mind, which quickly assimilates and forms a correct judgment on impressions received. Let us now consider some of the causes of acquired bias, by which I mean the bias that may affect a mind of good average development and possessing scientific aptitude.

Imperfect education is one of the chief causes. Nowadays scientific subjects are better taught at public schools than they used to be, and before beginning professional studies the student has to pass an examination in chemistry, physics, botany, and zoology. Still, judging from a long experience of medical students, there appears to be something lacking in the methods adopted to train them for medical work. Whether this be so or not, it is very important at the commencement of their hospital career that pains should be taken in teaching them how to observe, and I need hardly say how well scientific methods of investigation are taught at University College Hospital.

Let me give you a few examples of errors that may result from imperfect training. Mr. A— is asked to look at a patient's face and to say what he notices abnormal. For some reason or other he studies the colour only, and mentions some minute departure from a healthy tint, which is of no importance. The bias of colour having entered his head he omits to notice anything else. Now the striking abnormalities are, that the left palpebral fissure is narrower than the right one, and the left pupil is smaller than the right pupil, and Mr. A— has to be taught to study not only colour, but shape and size, and also expression as revealed by the condition of the muscles; these are headings which he must review before giving an answer. Mr. B— is asked to examine the heart of a patient, and having seen his teacher remove his stethoscope from the mitral area, he auscultates in the same place, and then says that he cannot hear any murmur. The teacher says, "Well, have you finished the examination?" and Mr. B— listens again in the same place with the same result, and has to be told that it is desirable to examine the aortic as well as the mitral area, where he at once hears a loud diastolic bruit. The reason he restricted his examination to the mitral

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area, was because he saw his teacher's stethoscope leave that area, and the bias to examine that part only had unconsciously fixed his mind. Believe me, this is by no means an unusual case, and it does not mean that Mr. B— is at all mentally dull, but it illustrates the dangers of allowing our minds to get fixed in a groove. Sir Russell Reynolds used to tell us, that once at the practical examination in medicine for the London M.B., he asked the candidates after they had examined one of the skin cases, if they noticed anything else wrong with the patient, and most of them failed to observe that one side of the face was completely paralysed. They were biassed in favour of skin lesions, and could not observe anything else. If they had been told that the case was a nervous one, the facial paralysis would not have escaped their notice.

I remember seeing one of the examiners for the Victoria Degree take a candidate to a case of hemiplegia; in showing him the case, the examiner's fingers accidentally pointed in the direction of the patient's face, and I saw the candidate restrict his attention to the face until the examiner suggested that he had better examine other parts of the body, when he soon spotted the hemiplegia.

I might give you many other examples to show you how important it is to prevent your minds keeping too much in one direction. The cure is to have a detailed, methodical scheme in your head, and when you feel nonplussed over a case to ask yourself if you have gone through all the headings of your scheme. One of the best tests for an advanced student is a case of uncomplicated aphasia. You say: "This is a nervous case, what is your diagnosis?" If the student is imperfectly trained in method, he examines for disorders of muscular action, of sensation, and of the reflexes, and finds nothing abnormal. He may remember the special senses, and still he finds nothing wrong; he now feels at sea, for he has forgotten to examine for any disorders of language.

Bias of authority.—Under the term authority we include all statements with regard to disease and its terminology which are to be found in the best medical literature. It seems paradoxical to affirm that the knowledge of disease already in our possession, while certainly tending to the advance of medical science, acts in some degree as a retarding agent. And yet there is an element of truth in such a statement. A fresh discovery in medicine may turn the mind too much in one direction, may give it the satisfaction which fixes its ideas, and thus delay the comprehensive view which is necessary for real progress. The history of peripheral neuritis is a case in point. When I was a student, multiple peripheral neuritis was never mentioned; the forms of paralysis now classed under that heading were attributed to lesions of the spinal cord. About eighteen years ago the condition began to be recognised, and ten years ago it was all the fashion, and almost everything was peripheral neuritis. The strong bias in favour of the peripheral nerves prevented an adequate consideration of the possibility that peripheral lesions might be secondary to central ones.

Then came improved methods of examining nerve-cells; these showed minute changes which previously were not visible. The mental pendulum now swung back from nerve-fibres to nerve-cells, and some persons asserted that all lesions found in the peripheral nerves were really started by changes in nerve-cells. At the present time the pendulum appears to occupy an intermediate position between these two views.

All authoritative statements, even the names of diseases, may be regarded in a sense as productive of mental bias. The remedy is to strive with all our might and main to acquire a scientific habit of mind, and I feel sure that our attempts will be greatly aided if we follow the excellent advice which Professor Clifford Allbutt recently gave to the students of the Middlesex Hospital. He recommended that every student of medicine should pass some time in original research, not with the expectation of making a discovery, but because it would build up in him a scientific habit of mind.

Let us glance for a moment at the limitations that a classification of diseases into curable and incurable may impose upon the mind. If we make an original investigation into this matter, and think it out for ourselves, and day by day make observations with regard to the course and terminations of morbid processes, we find ourselves less able to draw sharp distinctions between curable and incurable disease. We meet with formidable disease which appears to have been started by some simple ailment that we had regarded as completely cured. For example, we examine a girl of fifteen and find the physical signs of pul-

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monary tuberculosis, and we remember that four years ago she had a slight attack of measles from which she made a good recovery; but the mother says that her cough never completely disappeared, that it became worse during each winter, and that for several months the girl has been wasting and occasionally very feverish.

Again, we attend an adult suffering from influenza; in a fortnight or three weeks he appears to be quite well, but a year later he consults us for headache, nervousness, incapacity for work, and other symptoms which constitute the condition known as neurasthenia, and he says that he has never been the same man since the attack of influenza.

On the other hand, if we study diseases that we had regarded as incurable, we are surprised to find that every now and then an apparently complete cure is established. Thus every physician can recall cases of hæmoptysis followed by consolidation of an apex in which, after a year or more, the symptoms and physical signs had entirely passed away. Occasionally we see cases presenting the classical symptoms of tumour of the brain in which, after a time of anxiety, a stationary stage is reached; the prognosis becomes more hopeful, and as regards the prospect of mere existence it may be very good. More rarely we see a child recover from symptoms which characterise the presence of tuberculous meningitis.

In illustration of these remarks, I will briefly give you the clinical history of one of the most remarkable cases of recovery from symptoms of organic nervous disease that I have ever seen. A girl of twenty-two was under my care at the Manchester Royal Infirmary from October, 1893, to May, 1894. There was a history of headache, of impaired vision, and of occasional partial losses of consciousness. On admission she was dull, apathetic, and hysterical. There was partial paralysis of the right arm and leg, and at times of the right side of the face. Optic neuritis was well marked; she suffered from constant headache, and pain was caused by pressing on the occiput and neck. At first cutaneous sensibility was normal, but at a later period there was partial anæsthesia down the left side. Then paralysis of the right external rectus was noticed. Subsequently the hemianæsthesia disappeared, and the left limbs became weak, but they were not so paralysed as the right limbs, which at one time seemed to be deprived of all power of voluntary movement. Optic atrophy succeeded the neuritis, and the girl became absolutely blind with the left eye, and partially blind with the right eye. During this time the right knee-jerk was exaggerated, and the left one very feeble; there was no ankle-clonus. In December, that is three months after admission, double ptosis developed. In January the ptosis had disappeared as well as the paralysis of the right external rectus. In February she passed every night in a semi-conscious delirious state. In March she was able to walk with assistance in a feeble manner. On leaving the hospital in May she went to stay with friends in London. Towards the end of 1894 Dr. Beevor wrote to me saying that she was an inmate of the National Hospital in Queen Square. In reply to his inquiries I gave him the history of the case, and said that if it had not been for the optic neuritis and the affection of the right sixth nerve I should have been inclined to regard the case as a so-called functional one. A few months later he wrote again, saying that her symptoms had become worse; vomiting and headache were severe, there was marked staggering in walking, double ptosis was present, and there was anæsthesia down the right side.

Dr. Beevor thought there was a tumour in the neighbourhood of the left occipital lobe, and, after a consultation with Mr. Ballance, it was decided to trephine. Mr. Ballance operated, and found nothing abnormal. The patient made a good recovery from the operation; the headache and vomiting ceased; the ptosis, however, and a loss of conjugate movement of both eyes to the left persisted, as did also the right hemianæsthesia. A few weeks later she became maniacal. But what was most interesting, wrote Dr. Beevor, her ptosis, conjugate paralysis, and hemianæsthesia all disappeared, and her sight returned, so that she could read small print. "I am now inclined to agree with you that, except for the optic neuritis followed by atrophy, the case looks very like a functional one." The girl was sent to the Bethlem Asylum. Some eighteen months later I was surprised to receive a well-written letter from her, in which she stated that she was quite well with one exception, namely, that her eyes became painful after reading a few words.

Time will not permit me to comment on this

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remarkable case, but I would repeat that definite objective signs of brain disease were observed both in Manchester and in London, that they entirely passed away, and that the patient regained her health, and was able to resume her occupation.

Such experiences as I have mentioned to you tend to modify our views in two directions. They make us more careful in our treatment of ailments that tend to recovery, more hopeful regarding those which, as a rule, pursue a downward path. We begin to believe (1) that an attack of illness, however slight, may leave behind it some weak spot which, after months or even years, may be attacked by a toxin or other irritating agent, and become the starting-point of chronic progressive disease; and (2) that severe organic disease is not always fatal, that occasionally the morbid process is arrested, and in exceptional cases even completely cured.

The bias of inclination.—This is especially dangerous. It comes to the fore in reports of cases, in essays and monographs on special diseases. A writer who has collected a number of cases of the disease which he is investigating finds that the greater proportion of the features presented by those cases support a definite view, to which he himself is much inclined. Hence, perhaps unconsciously, he does not give full consideration to features which point to another conclusion. He regards these as exceptional: he lays stress on facts which favour what he wishes to believe, and ignores facts which tell against his inclination. He makes deductions not simply from the facts observed, but from the facts *plus* his own expectations and wishes. Truth is forgotten, and error is the result.

The bias referred to is a constant snare; it not only leads up to false conclusions, as just mentioned, but it may be the consequence of a correct conclusion, and thus produce a tendency to overlook the significance of events which occur at a later date. This may be illustrated by a reference to hysteria. A doctor examines a patient with thoroughness and care; he finds well-marked symptoms of hysteria, and no signs of any other disease. His diagnosis is hysteria, and it is a correct one. Three months later the patient consults him again. Having already made up his mind that she is hysterical, his investigation of the case is not a careful one, and he fails to seriously consider certain fresh symptoms which mark the onset of disseminated sclerosis. I will give you an example of error from this cause which occurred in my own practice. About sixteen years ago I was sent for to see a lady aged fifty; she complained of an aching pain in the back, of creeping sensations in the lower limbs, and of being easily tired by short walks. Her manner was distinctly hysterical, and she was very loquacious, giving graphic details of all her symptoms. A careful examination revealed nothing abnormal; there was no paralysis, and no alteration of the cutaneous sensibility, and the knee-jerks, though irritable, could scarcely be said to show real exaggeration. I looked on the case as hysterical, and prescribed massage and tonic treatment. As there was not much improvement after a fortnight's treatment, I asked an eminent physician to see her with me. He made a thorough examination of her case, and agreed with me that there were no signs of organic disease, and that in all probability the case was one of hysteria, and nothing else. After the consultation I visited her from time to time; but, having now a strong bias in favour of hysteria, I did not again make a thorough examination. About ten days later I received an urgent message to visit her. I found that she was suffering from complete paraplegia and from other symptoms, indicating an acute myelitis in the upper dorsal position of the spinal cord, and she died within the week. Such an experience as that is not easily forgotten. It teaches us that, having decided in favour of hysteria, we must not close our mind to the possibility of future developments. An hysterical person is just as liable as—perhaps more liable than—other persons to become the subject of organic disease; also we must admit the possibility of having misinterpreted some of the symptoms; and, further, the manifestations, although purely hysterical, may have been started by minute yet definite structural changes, which ere long will lead to symptoms of serious augury. Hence let subsequent examinations be as thorough as the first examination, and quite unbiassed by the first diagnosis of hysteria. Only in this way can we avoid the danger of omitting to recognise signs of serious disease.

The bias of specialism is another danger to be guarded against. A division of labour is necessary for the advancement of any science, but if energy is concentrated in a particular direction, it need not be wholly expended there. The throat, ear, eye,

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brain, or heart specialist must not limit his attention to one of these particular organs; he may find it necessary to devote his spare time to a study of its diseases, but he must remember its relation to other parts of the body. And when examining a patient he must consider the organism as a whole rather than as made up of parts artificially linked together. It is necessary, for example, for a neurologist to avoid attributing every symptom to a disease of the nervous system; if his patient suffers from palpitation, he must make sure that the heart and stomach are sound before he diagnoses a cardiac neurosis.

It is desirable, too, for a throat specialist to restrict his tendency towards the diagnosis of adenoids, and to restrain his ardent desire to cut or scrape the throat of every child who is brought to his consulting room.

Some time ago a provincial doctor had a case of alcoholic neuritis. The paralysis had the usual distribution, the flexors of the ankles and the extensors of the wrist being mainly affected. The man could walk, but only with difficulty; his feet trailed, and his gait showed a moderate degree of the high-stepping character. In addition to paralysis the patient suffered from other symptoms of chronic alcoholism; one of these was marked huskiness of the voice. His friends became anxious about the condition of his throat, and persuaded him to consult a London throat specialist. The specialist made a careful examination of the man's larynx, and in his letter to the doctor he described the morbid appearances he had found and the line of treatment he wished to be pursued; but he omitted to mention the condition of the man's limbs, and did not seem to have recognised that the main features of the case were those of alcoholic paralysis.

The last bias that I would direct your attention to is the *bias of physical signs*. The thorough investigation of the condition of a patient involves something more than percussion and auscultation; it ought to include a thoughtful consideration of the appearance of the patient, of the history of his illness, and of his present complaints. A patient is not an automatic machine into which you can drop a penny and pull out a particular disease ready for treatment; on the contrary, the organs by which he moves and lives are composed of living tissues which have a past history and a future development, both of which require consideration before we can grapple with his case.

We cannot pretend to have made a complete examination of any patient until we have studied the chief influences (hereditary or otherwise) to which his organism has been exposed in the past, and have fully considered its present condition and environment, together with its capacity for existence and health in the future. Every patient is different; no two cases of the same disease are identical, and while the technical details which you learn during your college and hospital curriculum are sufficient to get you through your examinations, they are not sufficient to make you good doctors in the best meaning of the term. The thoughtful qualified man, who has begun (as I trust you will ere long begin) to have patients of his own, soon discovers how intricate and subtle are the agencies that affect human life, and that lead up to or modify disease. He begins to find out that he must study other things than mere medicine, in the ordinary meaning of the word, if he is to do justice to his patients. Well for him is it if in his student days he has acquired a taste for general literature, and has also in his spare time taken part in healthy sports and pastimes, and has in every way made his social life as bright and vigorous as possible. The descriptions of the various types of humanity by such masters as Scott, Thackeray, Dickens, and George Eliot will help him not a little to comprehend what I may call the inner life of his patients, and will give him a glimpse of those undercurrents which, though not so readily seen in real life, are constantly affecting its course, and frequently lead to disaster, if not to actual shipwreck; whilst the habit he has acquired of meeting with his fellows will not only give him health and happiness, but will fit him to continue that social education, that knowledge of humanity, which is so essential to his just appreciation of the many ills to which flesh is heir. The man who gets into the habit of regarding every patient as merely a case, who ignores the look of feebleness or of distress, or the expression of anguish, and thinks only of physical examination, is not well equipped for the diagnosis of obscure disease; he becomes a machine which is totally unable to unravel the complicated problems of human pathology. The lowered vitality and declining strength of a mother who has lost her only child

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are not revealed by physical signs and chemical tests, and cannot be adequately treated by drugs. But the doctor who has studied humanity as well as the pathology of tissues, recognises that the mother's mind is paralysing her body, and he knows that the greatest kindness and care, together with sunlight and change of surroundings, are the remedies that will help to keep life going till time has healed the wound.

True sympathy for suffering is sometimes as necessary for a correct diagnosis as for successful treatment.

In conclusion, let me say a few words about the preventive treatment of the disorder bias. How may we best acquire and maintain a scientific habit of mind? It seems to me that three things are essential, namely, care, doubt, and truth.

With regard to *Care*, it may be said at once that mistakes in the diagnosis of disease are more commonly due to carelessness than to ignorance. Just consider for a moment whether the usual examination of a patient is as thorough as it ought to be. Do we always take pains to make sure that our observations are absolutely correct? Do we always ask ourselves, "Have I investigated everything? Is it likely that the impression I have received of the case is due to some preconceived notion, and is this justified by the facts observed?" Looked at in this way, will our investigations of disease as regards care and thoroughness bear comparison with the experiments of a physicist or an analytical chemist?

Such considerations suggest, I think, that we need to bring to our work more calmness, more patience, more reflection than is at present customary. Is there not nowadays too much rush, too much hurry? I venture to believe that even the poor student who has to get through so much work in his five years' course would prepare himself better for his final examinations if he attempted less, but did that little well. For example, if a clinical clerk would quietly stick to his own cases, and earnestly study them in all their bearings, ask questions about them, and read and think about them afterwards, he would be better equipped for the final systematic course of reading which he must go through before presenting himself for examination, than if he scamped his note-taking in his eagerness to rush from ward to ward lest he should miss a clinic or a demonstration. Amongst many students and some teachers there appears to be a feeling that too much importance is attached to note-taking. Personally I take an opposite view, and firmly believe that a student who takes pains with his notes, and makes sure so far as he is able that they give a true picture of the case he is investigating, is far more likely to pass his examination than the man who trusts entirely to the knowledge obtained by listening to clinical lectures, or to the casual observations of the visiting physician. And certainly if we look to the future, and consider which method is most calculated to make a good observer and a good doctor, we have no hesitation in awarding the prize to the training of the mind which is obtained by going through such a system of note-taking as that which has always been taught at University College Hospital.

The second element is *Doubt*, "not the doubt which is born of flippancy and ignorance, and whose aim is only to perpetuate itself, as an excuse for idleness and indifference," but the true scientific doubt, which, as Descartes indicates, involves an intention "to arrive at a certainty, and to dig away the drift and the sand until we reach the rock or the clay beneath."

Does the history or the present knowledge of medical science warrant the self-confidence, the dogmatism, I might almost say the arrogance, which we see in so many of the contributions to our weekly papers and monthly journals? We talk glibly about neurons, and say how the doctrine has revolutionised neuro-pathology. A neuron means a nerve-cell with its short branches and its long fibre-process, and we are taught that there is no direct connection between one neuron and another. Is this knowledge so greatly in advance of what we previously knew, as to justify the statements made with regard to the discovery?

Then, again, while giving due credit to the progress made in regard to our knowledge of micro-organisms, their toxins and antitoxins, can we feel satisfied that the records of cures by antitoxins are absolutely trustworthy? Has unconscious bias entered into the accounts of these results? Have observers omitted to mention any facts which tell against such results?

Look still further at our knowledge of the causes of disease; have we much to boast about? A strong young man suddenly one day feels tired;

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he becomes very thirsty and passes large quantities of urine, in which sugar is found, and there are other symptoms which characterise the disease known as diabetes. The onset is so rapid that one imagines a spot in the floor of the fourth ventricle has been suddenly injured. Do we understand how the disease has been produced?

Another person, of any age, without previous ill-health, and with a good family history, has a fit; this is followed by other fits, and he goes on having fits for the rest of his life. Have we any clue whatever that will throw light on such a case? Is it not time to cultivate more humility, more self-distrust, and to begin, as Descartes did, "to strip off all our beliefs and reduce ourselves to a state of intellectual nakedness, until such time as we can satisfy ourselves which are fit to be worn"?

There appear to be two occasions, however, on which we are at liberty to make positive statements with regard to disease and its treatment. One occasion is when we are answering questions at examinations, the other is when we are giving information to patients about their ailments and advising them regarding their treatment.

The third essential that I have mentioned is *Truth*. The necessity for this in scientific investigations is obvious. As to the best method of attaining it I will again quote Descartes. "There is a path," he says, "that leads to truth so surely, that any one who will follow it must needs reach the goal, whether his capacity be great or small. And there is one guiding rule by which a man may always find this path, and keep himself from straying when he has found it. This golden rule is—give unqualified assent to no propositions but those the truth of which is so clear and distinct that they cannot be doubted."

Finally, gentlemen, if one thing helps us more than another to avoid the pitfalls of bias, and of hurried unscientific work, it is to put ourselves in sympathy with our patients, to care for them in the way that Dr. James Jackson, Oliver Wendell Holmes's hero, cared for his patients. "Jackson would have it that to *cure* a patient was simply to *care* for him. It was indeed to care for him as if his life were bound up in him, to watch his incomings and outgoings, to stand guard at every avenue that disease might enter, to leave nothing to chance; not merely to throw a few pills and powders into one pan of the scales of Fate, while Death, the skeleton, was seated in the other, but to lean with his whole weight on the side of life, and shift the balance in its favour if it lay in human power to do it. Such devotion as this is only to be looked for in the man who gives himself wholly up to the matter of healing, who considers medicine a science, or if not a science, is willing to follow it as an art,—the noblest of arts, which the gods and demigods of ancient religions did not disdain to practise and to teach."

MODERN ANÆSTHETICS.*

BY

J. FREDK. W. SILK, M.D.Lond.

GENTLEMEN,—It is with a feeling of great pleasure, but with an abiding sense of my own unworthiness, that I appear before you this evening. I should, I think, have asked you to place the honour of addressing you in other hands but for two reasons. In the first place, I felt that I ought to ascribe your kindly invitation as extended to my official position as President of the Society of Anæsthetists, rather than to me personally. In the second place, I was fortified by the idea that of all medical and scientific subjects, Anæsthetics was the one to which Rudyard Kipling's instructions upon the writing of books might be most appropriately applied.

The students of that author may perhaps pardon me if I remind them of the volume of short stories published a few years ago under the title of 'Life's Handicap.' To my mind one of the best things in that book is the preface, in which Kipling places in the mouth of Gobind, a Hindoo holy man, the oriental philosophy of authors and writers of books, who are advised to speak "of those things that thou hast seen and they have seen together. . . . Thus their knowledge will piece out thy imperfections." And it is in the hope that I may count upon you to piece out, or, at least, to excuse my imperfections, that I venture to address you this evening.

* Delivered before the Leamington Medical Society, October 27th, 1900.

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In choosing a subject upon which to speak, I have taken into consideration the fact that, however great might be your interest in the scientific aspects of anæsthetics, yet the pre-eminently practical nature of your everyday life must of necessity give you a still greater interest in the application of these scientific truths to routine work. I propose, therefore, to pass in review the more modern methods of inducing general anæsthesia, pointing out how these methods differ from those formerly employed, and so, I hope, bringing home to you the fact that the subject of Anæsthetics is well abreast of the times in respect to the progress which has been made in the practice of this particular branch of our art.

As an example of this progress I would, first of all, ask you to compare the former position of Anæsthetics from an academic point of view, with what obtains in the present day. Although even now there is much to be desired in this direction, yet I feel quite sure that ten or fifteen years ago anything like formal instruction or teaching of Anæsthetics was quite exceptional in the medical schools. Now, a student is almost always encouraged, and in many schools he is expected or obliged to receive a minimum of practical instruction at the hands of teachers and administrators appointed for that express purpose. Nobody, however, who is interested in the subject can, I fancy, feel satisfied with this amount of progress. For instance, it is not unreasonable to express some surprise that the diploma-granting bodies should take such little interest in this matter. I have seldom come across a patient who, when questioned, did not say that he dreaded the operation less than the taking of the anæsthetic, and I am sure that the public at large would be astonished if they knew that the examining bodies took such little pains to ascertain whether the candidates that came before them were qualified to undertake duties in which, to a greater extent, perhaps, than in any other in our calling, the lives of our patients are placed so absolutely at our disposal. But I am afraid that the War Office is not the only public institution that requires reorganising, and until both professional and public opinion has been roused to the importance of this question, we shall have to be grateful for small mercies, in the sense, that is, which defines gratitude as being a lively sense of favours to come.

Another well-marked example of the changes made of late years is exhibited in the altered condition of affairs in regard to the anæsthetic question generally. A few years ago we were all either "etherists" or "chloroformists." Discussions upon anæsthetic questions either started with, or quickly degenerated into mere expressions of personal preference for one or other drug for all purposes, and under all conditions. This became very monotonous, and the term "anæsthetic controversy" almost became a byword to express any discussion that was more than usually "flat, stale, and unprofitable." Now, I am glad to be able to think that we are gradually shaking ourselves free from this narrow view, for I believe that it is pretty generally recognised that the selection of the proper anæsthetic for the particular patient and operation are far more important, and both practical men and controversialists are chiefly concerned in determining the indications for the use of any particular drug; for each anæsthetic has its value, and each its appropriate time and occasion.

The foundation of the Society of Anæsthetists, in 1893, has not only helped to encourage these broader views, but is in itself an indication of the increased interest now taken in the subject. Although their 'Transactions' have only been issued in book form during the last two or three years, yet if you will glance at the contents of these two volumes I think you will agree with me in thinking that they form a very valuable contribution to our knowledge of the subject. As the aims and objects of the Society become more widely known, so the membership roll extends, and I hope soon to be able to add to the list the names of some of those I am addressing this evening.

The couplet in Tennyson's 'Locksley Hall,'

> "Men, my brothers, men the workers, ever seeking something new;
> That which they have done but earnest of the things that they shall do,"

has always been a favourite of mine, and is particularly appropriate to matters anæsthetic, or perhaps I should say that its general truth

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has been brought home to me very much since I have been associated with anæsthetics.

Of new drugs, new instruments, new methods, etc., there seems to be a never-failing supply. For example, in one work on anæsthetics I find a list of no less than forty-six different substances reputed to possess anæsthetic qualities; another more recent and very excellent work figures and describes no less than twelve inhalers that may be used for the administration of ether, while the number of new methods is almost in exact proportion to the number of anæsthetists, on the principle, I suppose, of "*tot homines, tot sententiæ.*" Many of the novelties are only of interest because they are new; most of them, I am afraid, indicate in their introducers a lack of that sense of proportion which is not at all uncommon among inventors all the world over. They are chiefly useful in affording evidence of how good results can sometimes be achieved under adverse circumstances, and do greater credit to the manipulative skill of the inventors than to the instrument with which he works. Some few of these novelties seem to me to be more worthy of closer study, either because they introduce or emphasise important principles of practice, or else because they are steps in the direction of simplifying our existing methods, which latter I take to be one of the greatest, and therefore one of the most rarely practised, of modern medical virtues.

All this restlessness, all this reluctance to follow in a groove is a very healthful and hopeful sign, and one which is in itself an indication of the strength of our position.

Coming now to matters of detail, I would first draw your attention to the subject of local anæsthesia. In the first place, I must protest against the view, sometimes advanced, and almost always implied, that those who, like myself, advocate and practise the administration of general anæsthetics must, of necessity, be opposed to anything in the shape of local anæsthesia. Personally I am inclined to welcome the local anæsthetic as another drug to add to our stock of pain-relieving substances, another bottle to carry about in our bags. Some modern surgeons are perhaps a little too apt to encourage their patients to run the risks of a general anæsthetic for altogether trivial operations, and it is for such cases as these that the local anæsthetic is particularly useful. As to the future of local methods it is almost impossible to prophesy, but as long as human nature is so varied I do not anticipate that we shall be able entirely to do away with, or even materially diminish, the use of general methods; in fact, as the matter stands at the present time, those who use local anæsthetics usually find it necessary to carry a general anæsthetic with them, to fall back upon in case the local plan fails, as it so often does. In short, the same principles of rational selection must be applied in local as are now adopted with regard to general anæsthetics.

The history of local anæsthesia is a most interesting one, and practically dates back to the very earliest ages of the surgical art; but I have neither the time nor the inclination to follow this historical thread, but prefer rather to direct your attention to the modern developments. Prior to 1884 the best known method of producing local anæsthesia was by means of the ether spray, of which the late Sir Benjamin Ward Richardson was such a strong advocate. In modern Anæsthetics this principle of rapid evaporation is applied in the use of metal or glass tubes containing anæstile, rhigolene, or some other fluid of low boiling-point which is forced out of a pin-hole orifice when the tube is held in the hand, and falls in a fine spray upon the part to be frozen.

In 1884 Köller, of Vienna, introduced cocaine, mainly with a view to its use in ophthalmic practice. Since that date the subject of local anæsthesia has received much attention, mainly at the hands of Continental and American surgeons. The most recent development is that which is known as the infiltration method. In 1891 Dr. Schleich, of Berlin, obtained very good results by the use of large quantities of cold, neutral salt solutions; results which were somewhat improved by the addition of cocaine and morphia. Using a special syringe, Schleich and his followers inject in average cases from two to three ounces of a solution composed of—

Cocaine	1	gramme
Morphia	¼	„
Salt	2	grammes
Water	2	pints

and care is taken in making the injections that the whole area of operation is completely sur-

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rounded and cut off. More recently Mr. Barker, of University College ('Lancet,' February, 1899), has advocated the use of considerable quantities of water at the body temperature, in which a powder having the following composition has been dissolved, viz.—

Eucaine Hydrochlor. B. ...	3	grains
Salt	24	„
Water (at 90°)	7	ounces.

I hope that it will be distinctly understood that I have no intention of advocating the use of these methods. I think that, useful as they have proved to be in some cases, and in the hands of some surgeons, they, and in fact all methods of local anæsthesia, have their limitations, and that English surgeons as a body have very wisely refrained from adopting them at all generally.

Coming now to the subject of general anæsthetics, I propose to introduce to your notice such of the more recent methods of administration as have, to some extent at any rate, established themselves as being likely to prove of practical value. The best way to do this will, I think, be to refer to the several drugs and mixtures and combinations *seriatim*.

I.—*Nitrous Oxide.*

For some years past the attention of anæsthetists and surgeons has been very constantly directed towards the study of this substance, with the result that by improved methods of administration its field of usefulness has been considerably enlarged. It is now generally recognised that nitrous oxide possesses properties as specifically anæsthetic in character as those which we are in the habit of ascribing to the vapours of ether and chloroform, the difference being one of degree rather than of kind, nitrous oxide being, of course, the most feeble of the three. Some of the symptoms hitherto ascribed to the use of nitrous oxide, such as the lividity, the stertor, and the twitching, are now known to be due almost entirely to the enforced absence of oxygen consequent upon the older methods of administration. When means are taken to supply the necessary amount of oxygen, not only do these objectionable features disappear, but, as the inhalation can then be continued for a much longer time, a more prolonged anæsthesia results. At first sight it would appear to be a simple enough matter to do this, and no doubt the many experiments which have been made of admitting atmospheric air have been partially successful; but the credit of demonstrating in a truly practical manner what could be done in this direction undoubtedly lies with Dr. Hewitt, who, by means of an ingenious apparatus, arranged for the inhalation of a mixture of nitrous oxide and minute quantities of oxygen. This plan was, and to some extent still is, very fashionable, and I have myself employed it in a large number of cases, but latterly, when the choice rests with me—which it does not always,—I reserve it for children, old people, and anæmic, feeble women. The objections to it as a routine method are that disagreeable after-effects are rather more apt to follow than with gas alone; and the apparatus is, as you see, complicated and costly. I have not quite been able to convince myself that, for dental purposes, with the exceptions mentioned (the extremes of age), the plan possesses any very really great practical advantages over the older methods; nevertheless, it has proved to demonstration the truth of a great principle and will, I am sure, always be found in the armamentarium of the anæsthetist. This plan, as applied to selected surgical cases, may be said to be still on its trial. It has undoubtedly proved successful in many such cases, but in others it has failed or given rise to untoward symptoms.

One effect of the introduction of the nitrous oxide and oxygen plan was, that it led to increased activity on the part of those who thought that a solution of the difficulty lay in the direction of the admixture of the gas with atmospheric air. The final stage has not yet been reached, but so far the results may be formulated thus:—That although the rigid exclusion of air may be necessary in the early stages, while the lungs are still full, there is no objection, but, on the contrary, an advantage, in allowing the entrance of air as the inhalation proceeds. In my opinion the best work in this direction has been done by my friend and colleague, Dr. George Flux. Dr. Flux first showed that it was quite possible to obtain a very fair degree of anæsthesia by pouring the gas into an open inhaler, or even into an inhaler

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improvised by folding a towel round the patient's face and chin. Although this is possible, the enormous waste of gas rather prejudices one against its routine use. More recently, Dr. Flux has devised a tube which can be fitted to the ordinary face-piece. So far as I have tried it, it works well; there is perhaps a little waste of gas, and it requires a little more than the usual amount of care in its manipulation; but one reason why it especially commends itself to me is, that it is a step in the direction of simplification rather than the complication of apparatus, for it does away with all valves. With some slight modifications I think that a tube of this sort is very likely to be of considerable value.

To some extent, of course, the plans to which I have just referred help us to solve the problem of obtaining a longer anæsthesia from the single application of the face-piece, as in dental cases, but work having this object more definitely in view deserves attention. The older plan was, as you very well know, to administer the nitrous oxide in combination with the more powerful anæsthetic ether. To this method I shall refer subsequently, when treating of that particular drug. More recently, it has been found possible to obtain a prolongation of the anæsthesia to an almost indefinite extent by flooding the mouth and pharynx through a mouth-tube, or through the nose with nitrous oxide itself. The chief workers in this field have been Mr. Coleman and Dr. Hilliard, Mr. Coxon, Mr. Patterson, and Dr. McCardie; the two former working through the nose, the three latter advocating the use of the oral tube. I must say that my peculiar prejudices in favour of simplicity, to which I have more than once referred, incline me to prefer the oral tube, of the efficacy of which I can speak from personal experience. In concluding this branch of my subject I should like to say that, although I think it is of distinct advantage to be able to prolong the anæsthesia of nitrous oxide, I hope that by admitting the value of the principle I shall not be held to justify its application to the wholesale removal of teeth, as is sometimes done. For reasons altogether apart from anæsthetics, I am most strongly of opinion that, when it is desired to denude the mouth at one sitting, the case should in every respect be treated as a surgical case; the patient should be put to bed, properly nursed, and properly attended throughout.

II.—*Ether.*

In respect to ether, the improvements in the means and methods of administration have not been of such a striking character as is the case in respect to nitrous oxide. The advocates of ether have been chiefly concerned in overcoming the prejudices of those who opposed its use. There has, it is true, been an abundant supply of new apparatus, but as most of the new instruments are merely variations, and not always even improvements, upon the older patterns, I shall not, except in one or two instances, refer to them.

Ether has, I think, suffered a good deal from the enthusiasm of its friends. I hope and believe that a more rational and broad-minded view is being taken of its possibilities. I quite admit that ether is the best anæsthetic to employ in many, or I would even go so far as to say in the majority of cases. To insist upon its use in every case is not only unjust to the patient, but unfair to the drug. The exceptions which I make to its use are in the very young and the old, the very stout, and those suffering from pulmonary affections or acute heart troubles, and in operations about the head and neck; further, I think that one should not hesitate to change the ether for another anæsthetic in any case in which it is found, in the course of the administration, that the ether does not agree with the patient, and I am rather inclined to the opinion that there is less risk to the patient in the proper administration of the A.C.E. mixture, than in badly given ether. In justice I must point out to you, however, that my views on this subject are considered to be rather retrograde in character by many of my colleagues whose experience and skill entitle their opinions to great weight; but, on the other hand, I believe that the signs of the times point to a leaning in my direction.

Of the prejudices against ether there are three which the modern anæsthetist has been called upon to meet, and, I think, successfully rather than otherwise. In the first place, it is objected that ether is "such beastly stuff." I admit the soft impeachment; it *is* beastly stuff if given in the raw state, so to speak, and for that very reason one of the earliest improvements

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made was the combination of nitrous oxide and ether, now known as the "gas and ether" method, with which, I have no doubt, you are all familiar. More recently it has been found of advantage in some cases to commence the inhalation with a few drops of the A.C.E. mixture, or even pure chloroform. This does not, it is true, get rid of the disagreeable after-taste, but you would be surprised how much can be done in this latter direction if you do your utmost to remove the gastric and buccal mucus and saliva as fast as they accumulate. Always keep the head turned well to one side; put the corner of a towel, or a strip of gauze or wool in the dependent angle of the mouth; if possible let the patient be turned well over on the right side when put back to bed; as soon as he is conscious, let him wash his mouth out and drink copiously of hot water. These are a few of the plans which I have found to be most efficacious; others will, I have no doubt, occur to you.

In respect to the administration of nitrous oxide and ether in combination, those who, like myself, prefer the plans advocated with such marked success by the late Mr. Clover, may perhaps like to see the three instruments—modifications of his own apparatus—which I now show you. One is an improvement on the larger of Clover's instruments suggested by my friend Dr. Dudley Buxton; the other is the pattern of the smaller instrument which I use myself, though I cannot claim to have invented it; and the third is a new pattern small Clover with a glass dome. The chief point about Dr. Buxton's improvement is, that the whole apparatus can be taken to pieces, and so every part is accessible and can be easily cleansed. In the smaller instrument, the well-known "whistle-ended" tube disappears, and a longer tube is substituted, so that the ether chamber can be rotated quite independently of the face-piece and reservoir bag.

The second prejudice against ether is that the patient is said always to be congested and livid. You will remember that I admitted the truth of the first prejudice, regarding the bad taste of the drug, but I am afraid I cannot be equally complacent in respect to the lividity, at any rate not as far as "Modern Anæsthetics" are concerned. The plan usually adopted now-a-days is to charge the patient's blood pretty fully with ether at the outset; this may take, at the outside, some ten or twelve minutes, and may be accompanied in certain cases with some slight degree of congestion; subsequently a very small amount of ether and a very large supply of air is all that is necessary, the colour being kept as in health. By the older plans the degree of anæsthesia was almost measured by the depth of lividity, but, according to more modern views, prolonged lividity is a sign either of bad administration or an indication for changing the anæsthetic. Another means of overcoming this objection is by the use, either continuously or in occasional doses, of oxygen—which is said to give rather a better anæsthesia; for the best work in this line we are indebted to Dr. Buxton, but I can hardly do more than refer to it here.

The last prejudice to which I shall refer is that which asserts that patients, after the administration of ether, are particularly prone to, what some are pleased to term, "ether pneumonia," or, at any rate, to respiratory affections of the catarrhal type. This subject has been discussed a good deal of late in the medical papers, and has also been debated pretty fully during the past year at two meetings of the Society of Anæsthetists. I am very far indeed from wishing to shut my eyes to established facts or authentic records, and I do not, in any sense of the term, hold a brief for ether—in fact, as I have already hinted, I am considered by some to be somewhat retrograde in my views on the subject,—yet I cannot but think a good deal too much has been made of this objection. I hope that, as a result of these discussions, it will be seen that, if an ether patient be treated fairly, and if ether be given properly, and in suitable cases, the ether patient is but little more liable to pulmonary troubles than a chloroform patient. A great deal, however, depends upon what the definition of fair treatment is. I see no harm in admitting that a patient after ether is more susceptible to cold and chills than a chloroform patient, and is, therefore, more likely to develop pulmonary mischief; but, knowing this, it is surely not fair treatment to subject an ether patient to the same *régime*, and to make no allowances for his susceptibilities. Modern practice in the matter of ether giving points to the desirability of having your operating

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room well warmed and free from draughts, not exposing the patient unduly, using warm lotions, and, above all—and this is a precaution often overlooked,—most carefully screening him from draughts when he is put back to bed.

III.—*Chloroform.*

When the medical history of the nineteenth century is written, one of the most interesting chapters will be that which relates, not only the discovery, but also the subsequent career, of chloroform. From its very first introduction, down to the present day, chloroform has been the subject of the most violent controversies, in which some of the ablest scientific men of their day have taken part. Simpson was obliged to fight vehemently for the very existence of his foundling. Snow, as indicated by his great posthumous work on anæsthetics, published in 1858, devoted much attention to its study. In the meantime Syme and the Edinburgh School had, by constant and intelligent exercise, maintained the bantling in full strength and vigour. About 1861 Lord Lister devoted his attention to the subject. Then followed a period of comparative repose, only slightly disturbed by the reports of the Medical and Chirurgical Society (1864), and the British Medical Society (1879). In 1889 the so-called "Hyderabad Commission" was appointed, for the express purpose of confirming the views of Syme and his followers. For this reason it can hardly be considered a strictly scientific inquiry, yet, nevertheless, it has left behind it records of considerable interest. To the gage of battle thrown down at Hyderabad there was a rapid response, and some of the most able physiologists of the day, such as Gaskell and Shore, McWilliam, Leonard Hill, Waller, etc., were soon engaged in a fierce controversy. As I took some part myself in the fight from the standpoint of clinical observation, I am not, perhaps, quite able to judge fairly between the contending factions; but I cannot help thinking that the general result has been that at the present day the view is that it is not the respiratory centres alone which are affected in cases of chloroform poisoning, but also the heart; and that, occasionally at any rate, the heart is affected more profoundly and earlier than the respirations.

Although all this controversy has considerably increased our scientific knowledge, it has not, I am afraid, had a proportionate influence upon our practice, except perhaps in so far as it has made men alive to the importance of the subject, and so has led to greater care and a less indiscriminate use of the drug.

As you all know, chloroform is still largely administered by dropping it upon lint or the corner of a handkerchief, or, as I prefer, on to a Skinner's frame-inhaler. A useful modification of this latter is known as Varjun's inhaler with glass sides. It has, I believe, been found very efficient, but I have not ever tried it myself.

The well-known Junker's bottle is claimed by many to be the most scientific means of administering chloroform, but with this claim I do not agree, although, as a matter of convenience, I use it very frequently. This apparatus has been improved almost beyond recognition by Krohne and Sesemann.

To overcome the difficulty sometimes caused by the presence of the chloroform in a liquid form, and the consequent danger of its being forced into the patient's mouth, many plans have been adopted; the last, I think, is that of my friend Dr. Flux, who has devised an instrument in which the chloroform is poured upon a tampon of cotton wick, over which the air is drawn on its passage to the face. I am quite aware, of course, that, if for no other reason than its convenience and the simplicity of its administration, chloroform is, and possibly always will be, the favourite anæsthetic of the busy practitioner; but for those who, like myself, are engaged in nothing else but giving anæsthetics, the administration of chloroform is rather the exception.

For my own part, in the many cases in which I do not care to give ether, my next choice is generally the A.C.E. mixture.

The chief objections which have been raised to this mixture are, in the first place, that the components of the mixture come off at different temperatures, and so lead to undue concentration of the chloroform after the first few inhalations. Theoretically, of course, this ought to be the case, the boiling-points of the different drugs being so distinct; from experiments made in the laboratory, however, by Mr. Smiles, and quoted by Professor Ramsay in a paper read before the Society of Anæsthetists on November 17th, 1898,

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it would appear that "even at the end of the evaporation some ether always remains with the chloroform." This view is borne out by the experience of those who have had most experience with this mixture clinically. Of course there is a greater possibility of this concentration of chloroform when the whole dose of one or two ounces is poured upon the sponge at once; but that is not the proper way to administer the drug, which should be given in small doses, of one or two drachms, at frequent intervals. When this is done I do not think that any trouble is likely to arise. Another objection is that the liquid is apt to run over the patient's face. To meet this difficulty I have devised a face-piece which, being made of metal, can be boiled or scrubbed in lotion,—for we are all aseptic in these days. The celluloid inhalers, too, which I introduced some time ago, are an improvement upon the leather masks of a generation back.

If I were called upon to summarise my reasons for thinking that "Anæsthetics" is a branch of our art which has not in any way fallen behind the progressive tendencies of the day, I would point out:

1. That the careful and systematic teaching of Anæsthetics by specially appointed teachers is now the rule rather than the exception in most medical schools.

2. That discussions upon Anæsthetics are now assuming a less narrow and less personal character.

3. That work of the highest scientific value has been done of late in developing the principles which underlie the action of the various drugs.

4. That by the application of these new principles, new methods of administration have been introduced, some of which are of great practical value.

Tubercular Meningitis following Operation for Ectopic Gestation.—Jacobs noticed, while operating for ruptured tubal pregnancy, that the appendages, uterus, and parietal and visceral peritoneum were covered with small tubercles. The next morning symptoms of tubercular meningitis developed, and death occurred thirty-six hours after the operation. The question is raised whether this complication was due to a bacterial embolism or to the aggravation of a latent meningitis.—*Amer. Journ. Obstet.*, October, 1900.

A CASE OF HERPETIFORM MORPHŒA.

Demonstrated at the Medical Graduates' College and Polyclinic,

By JONATHAN HUTCHINSON, F.R.S., F.R.C.S.

THIS youth has an affection known as herpetiform morphœa, that is to say morphœa or changes in the nutrition of the skin distributed according to the pattern of herpes. That is why the term herpetiform is used, and I think it is by far the most appropriate one. It does not usually appear in one patch, as in herpes zoster, but in a great many patches, some of which are almost exactly like those of herpes zoster. Herpetiform morphœa, however, is often much more multiform than herpes zoster; it may cover the whole body almost, but, however much of the surface is invaded by it, it is never bilaterally symmetrical; it may be bilateral, but not symmetrical. We therefore argue that it is not due to any blood disease, that it does not begin from anything inside at all, but that it begins from something acting upon either the nerve-trunks or the nerve-centres, and the whole of the disturbance of the nutrition of the skin is consequent upon some affection of the nervous system. It is not connected with the taking of any drugs, so far as we know, although we know herpes may sometimes be induced by taking arsenic. These cases are extremely interesting, although very rare, and so not of very great practical import. But in pathological teaching they are invaluable, as proving what disturbance of nutrition may result in some obscure way from the nervous system. I do not think anyone will doubt, from the cases of which I shall show you illustrations, that the location is by nerves; but in all of them I ask you to note that the lesions do not correspond on the two sides of the body; there is no bilateral symmetry.

In this youth it is fifteen months since the first patch came out. In herpetiform morphœa the patches all come out at one time, or are, at all events, traceable to one shock of the nervous system. In herpes zoster it is known that when the disease has once come out you do not expect to see any other outbreak. But mistakes are

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often made in these cases. In herpetiform morphœa the development is slow, taking several months. But still there is good reason to believe that all the patches are marked out for development at the same time, that is to say, from the very first. People will often tell you, as in this case, that the second patches have come some months after the first. I think it is really that they have become virulent later, but that they were marked out before. In this patient you see there is a large and well-defined patch on the chest, covering the lower part of the pectoral region, and then the condition passes down his arm. There is another patch running down in the territory of the intercostal humeral nerve. Then it comes down indefinitely, so that I can hardly demonstrate it, but anyone passing his hand down will feel that there is rigidity of the skin down the forearm, and you will notice that the patient cannot quite straighten the fingers. I ask you to notice that there is no patch on the intercostal region of the other side corresponding to the large patch, nor on the arm. Here is an ivory patch, but for the most part the condition is a brown discoloration. Part of it is of a very vague and indefinite character, and might easily be overlooked. On the back we can see ivory patches dotted here and there. There is a close approach to bilateral symmetry on the back, but it cannot be said to be symmetrical. On the trunk there is not so much to be seen as on the lower limbs. Here is a great band of indurated skin running down the front of his leg, the skin being brown and adherent to the bone, the cellular tissue as well as the skin being affected. Moreover his muscles in the right leg are not so plump as in the left. The condition becomes so vague lower down that it is very difficult to say where it ends in the foot region. It follows the distribution here of the anterior trunk of the nerve, which goes down to his great toe. There is nothing corresponding to this patch on the other leg. The change in this case has involved the nutrition of the muscles as well as of the skin. Sometimes there is a degree of paralysis present, but here it is not so much paralysis as wasting. The fact that the condition is vague in parts is important, as showing that it differs in severity in different parts of the body. Sometimes there is a thick lardaceous patch involving not only the skin but also the subcutaneous tissue. It is very evident in this case that the cellular tissue is involved. Here is a sketch showing a lardaceous patch, but in a very much more advanced condition than in our present patient. Our patient is in perfect health in other respects; his face is not involved, and it is certain that no other patches will now appear. On his neck can be seen a brown patch and a glistening lardaceous patch which has become polished on the surface.

With regard to prognosis, it will remain as it is for a year or two and will then slowly disappear and the skin be restored to perfect health. The atrophy of muscles may be permanent, but matters may become righted in the end. The affection takes several years to disappear. There is no decrease of sensibility in any of the patches. The contraction of the hand shows that there is some implication of the flexor muscles.

I show you the picture of a case in which the lardaceous patch implicated the nerve territory of the saphenous vein. That would seem to imply that the disturbance in nutrition is not in the nerve-centres, but in the nerve-trunks, for here it picks out one particular nerve. It runs down the back of the calf almost subcutaneously, and then is distributed to the outer side of the foot. I have had several cases in which this nerve alone was affected; and that one nerve is liable to other curious affections, of which I cannot now speak.

Here is another drawing showing what is called hemiatrophy of the face, in which one half of the face is arrested in its growth. This happens when the affection begins in the face before the subject is properly developed. If the disease occurs in adults it leads to no atrophy at all. This drawing shows an abrupt line down the middle of the face with atrophy on one side and full development on the other.

I am asked what the treatment of herpetiform morphœa is. Well, we attend to the patient's general health, and use some lubricant to soften the skin. Any emollient will do for that, but it is very important to look to that matter. In general I also give a little arsenic, but, I confess, only on a very slender hypothesis as to its being of any value. I give about one minim three times daily. The great point is to be able to assure your patient that there will be no further outbreak. If it is a very mild case I am accustomed to mention a warning case I had, in which a lad was very much worse in his lower extremities; his leg was bent up, and he had a very large ulcer over his knee, so that his knee was an encumbrance to him. I advised him to have it amputated. This was declined, and the patient recovered. In many cases amputation has been practised, but my rule would be never to amputate. You do not know how great will be the restoration; the limb may look as if it were quite lost, but the skin may nevertheless recover all right. I often refer to a case of herpes zoster in which the band of herpes vesicles had beneath them another band of old scars of a previous attack. That shows again the analogy between herpetiform morphœa and herpes zoster. They are very different in their results, but both are lesions involving the nutrition of the skin and following the distribution of the nerves.

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CLINICAL REMARKS

ON

TWO CASES OF RENAL CALCULUS AT ST. MARY'S HOSPITAL.

By EDMUND OWEN, F.R.C.S.,

October 25th, 1900.

GENTLEMEN,—The first cases coming into the theatre to-day are two men with renal calculus, or perhaps I should say, two men in whom we have diagnosed the presence of renal calculus. Most of you will remember that we had them before us three days ago, when we entered somewhat fully into their histories.

The first is a small individual, a little over twenty years of age, who works in a chair factory. He has been sent up to St. Mary's Hospital by Dr. Lewis Reynolds, of High Wycombe, who writes that he is of opinion that the man has a stone in his right kidney. The dresser will now give us the chief features of the clinical report. From this it appears that the most prominent symptom is the subjective one of pain. The pain is confined closely to the right renal region and to the back. To make quite sure that the pain was not, by chance, secondary to lumbar caries, we examined the back very thoroughly last time, and found that all its movements were free. The pain evidently proceeded from the kidney, but there was no *tenderness* in that part. Tenderness is an important subjective sign of renal calculus, but it is often absent. The man tells us that the pain is generally worst after a hard day's work, also after much stooping, and after a long walk. He says, moreover, that sometimes when he is lying in bed at night the pain comes on with great suddenness and acuteness, and that it doubles him up. When this happens he finds it best to lie quietly curled up in bed, and he gets his mother to apply a large linseed-meal poultice over the loin, and thus he obtains relief. He is an authority on fomentations, and he says that

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nothing ever does him so much good as a linseed-meal poultice. There is, I apprehend, no special virtue in linseed-meal; what is wanted is a soft, closely-fitting material which shall retain the heat and moisture for a long while. King Hezekiah, you will remember, was advised to apply as a fomentation to his serious furuncular trouble, a poultice of figs. The application of heat and moisture by means of linen wrung out in hot water and covered in by an ample sheet of mackintosh could not have been prescribed in those days. It is, however, what we should now employ, though a sheet of spongio-piline is a most useful thing to have at hand for the purpose.

The fact of the pain suddenly coming on when the man was lying quietly in bed, as well as after exercise, we took as a suggestion that, first, the stone was loose in the interior of the kidney. A stone which is fixed, and branching into the calyces like a spray of coral perhaps, would be far less likely to cause distress. Indeed, sometimes a large concretion is found at a post-mortem examination of a man who has died after a prolonged stay in hospital without his ever having made complaint of renal pains. Second, we thought that the stone was small. It evidently shifted its position, and the larger a stone is the less it moves. Thirdly, we thought that the stone was a hard and heavy one—because of the sufferings which it caused.

Having thus placed the subjective sign in the forefront of our clinical description, we come to a cardinal objective feature of renal calculus, namely, blood in the urine. This may be caused by the direct injury to delicate renal tissue by the concretion, or it may be the result of a giving way of engorged vessels in a localised nephritis which has been set up by the stone, for a stone cannot be moving about inside the kidney without injuring the gland, and inflammation invariably follows injury to a living tissue. According to this man's intelligent account, he has had blood in his water from time to time. On asking him how he knows that there was actually *blood*, he says that the urine was sometimes bright red, though, at other times, it was dark, like coffee. After this we can hardly question the truth of his statement. In the case of the urine being coloured bright red, the blood had passed with the urine just as it came down fresh and clear from the kidney, and in the other case it had remained for some time in the bladder, so that the urine had time to act upon and darken the colouring matter. You will remember that when we had him before us three days ago, we questioned him very closely as to whether the blood-storm came just after one of his attacks of pain or not. He was quite sure that it did not. What we wanted to make out was this, that the loose stone fell into the upper opening of the ureter plugging it and being gripped, and so damming up the urine in, and stretching the nerves of, the distended kidney. This would cause great distress, and, whilst the ureter was so plugged by the stone, no blood could find its way down into the bladder, however free the hæmorrhage might be in the kidney and its pelvis. But as soon as the stone falls back—uncorking the ureter, as it were—blood is able to find its way into the bladder. And then it is, and then only, that the man has hæmaturia. I said, a little while ago, that a coral-like mass of calculus may occupy the kidney without causing pain; similarly, being fixed and quiet it may give rise to no hæmaturia. And let me say again that it is the small, loose, hard stone that is most likely to determine renal pain and bloody urine.

The dresser tells us that since the man has been in the hospital his urine has been clear and acid, and that it contained neither blood nor albumen. The patient told us last time that on various occasions he had passed "sand" in his water, and he insisted that the sand was whitish—"like silver-sand," not like cayenne pepper or red sand. What was the chemical nature of this "sand?" It could hardly have been a phosphatic deposit, for his water is clear and acid. From his description it would not be uric acid, which is, as a rule, reddish, or highly coloured. It was probably either a collection of urates or else a storm of oxalates—and I am inclined to the latter theory.

There is another suggestive feature in the clinical report—I might almost call it a characteristic feature of serious renal disturbance,—the man's pains have been frequently associated with attacks of vomiting. You will constantly find

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these two conditions going together. Thus, for instance, a boy is kicked over the loin, he vomits, and he passes blood in his urine. This is probably to be explained by the fact that the sympathetic nerves with which the kidney is so freely supplied are in indirect association with the vagus as well as with the solar plexus.

The operation.—The man was placed almost prone, with a pillow beneath his abdomen, and an incision was made from the erector spinæ horizontally outwards to the tip of the last rib. On exploring the posterior surface of the kidney nothing abnormal could be detected. The finger was then passed to the anterior surface, and the kidney was firmly pressed against the psoas, but still with a negative result. It was then squeezed between the finger and thumb throughout its whole extent, but no stone could be made out. Still, the symptoms had been so definite that I was loth to give up without a complete result.

There were then two courses to be adopted—either to prick the kidney all over with a needle in the hope of striking the foreign body, or else to loosen the kidney and bring it up through the wound in the loin for more particular examination. I adopted the latter course, for my opinion is that in searching for a stone with a needle it is quite easy to miss it, especially if it is movable, as we deemed this one to be.

When we had the kidney drawn out of the wound you noticed that Mr. Matthews (the house-surgeon) and I very carefully examined it from top to bottom, and from convex border to ureter, by gently pinching it between the finger and thumb. Then, about the middle, we thought we felt something firm, so I made an incision in the convex border and passed my index finger in to explore. I then found this small stone in the highest calyx, and brought it out with a pair of clip forceps. There was nothing firmer than a pyramid in that part of the kidney where we thought we had felt the stone. Here, then, arise two interesting points for consideration. The first is that if the something which we found firm in the pinch *was* the stone, it had clearly shifted its position as I was handling the kidney in making the incision. If this was so (and I think it quite likely), it is a suggestion that the surgeon cannot depend upon detecting the presence of a small stone by needling, for if it is loose it may easily slip out of a part of the kidney which has not been thus explored into a part which has been already needled, and so may just be missed. Secondly, if the something which we felt was only a firm pyramid, we must admit that previous to introducing the finger we had no sure knowledge of the presence of any stone, for we certainly had pinched the upper part of the kidney with a negative result.

I will assert, therefore, that needling, being an untrustworthy method of searching for a small, loose stone, and methodical pinching of the tissue, even when the kidney is drawn out of the wound, being insufficient, the only way of being quite sure that there is no stone is to bring the convex border of the kidney out through the wound and to incise it there for digital exploration. I shall go a step further, and will say that if a stone is felt in the kidney as the kidney lies in the depths of the lumbar wound, it is better not to cut down on to it and remove it, for in so doing the funnel-like end of the ureter may have to be widely opened up before the stone can be removed. Now this structure is fibrous only, and I do not think that it can be depended upon for securing prompt obliteration of the aperture after the stone is removed. A year or so ago I had a case in private in which the opening in the pelvis of the ureter, through which I had extracted a large stone, persistently refused to heal, the patient being left for many months with an annoying urinary fistula; at length, however, it did completely and permanently close. I think that even where the stone is known to be in the pelvis of the ureter it should be removed by an incision on the convex border of the kidney, for I apprehend that a wound of the healthy, vascular tissue of the kidney is much more likely to undergo prompt obliteration than one made through the fibrous tissue only.

To complete the operation we gently stuffed the wound in the kidney with a long strip of mercuric gauze, and we then dropped the kidney into its original position. After this, Mr. Matthews partly closed the surface-wound and covered it with bulky absorbent dressings under a binder.

I will now pass round the stone which we have removed. Notice first how dark it is—it is almost black. It has evidently obtained its hue from the blood which its presence has caused to escape,

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for no renal concretion is of itself as dark as this; phosphatic concretions are whitish, oxalates are colourless, and urates are naturally reddish or yellow. A phosphatic stone would be formed only when the urine is alkaline, but in this man the urine, as the dresser told us, is acid. It is, then, either a urate or an oxalate calculus. Next observe how heavy it feels and how dense it looks. Did you notice how sharp and clear a ring it gave when I dropped it into the basin of water? I should think that it will turn out on analysis to be an oxalate of lime calculus, and you can well imagine how great distress a small, hard and heavy concretion such as this is likely to cause. (The stone was slightly larger than a pea, and somewhat irregular in shape.)

The second case is a man of about fifty years, who was sent up by a late house-surgeon of mine, Dr. Smallwood, with the diagnosis of renal calculus. He comes from near Chelmsford, and he has been a butcher. Hearing what his trade was, we assume that he has been a great meat-eater, and we wonder if the amount of meat in which he has indulged has charged his blood with an excess of nitrogenised material which has partly crystallised out in his kidney to start a uric acid calculus. He has had severe pains for about nine months which have been confined to the renal and lumbar region and to the back of the iliac crest. There is no mention of inguinal neuralgias, nor of retraction of the testicle, nor any other suggestion that particles of stone have been forced down the ureter. Still, he says that he has passed gravel. He has had blood in his water on various occasions, and, as in the other case, he has had severe attacks of vomiting.

The dresser, Mr. Ramsay, has given us the interesting piece of information that the pains are always worse after the man has had a full meal, or even after the stomach has been distended by his drinking aërated waters. This is probably due to the fact that there is then increased pressure upon the inflamed kidney, and it is suggestive of great tenderness of the kidney. As a matter of fact, this patient has very great tenderness in the renal region. Though he makes his abdominal walls quite rigid as soon as we begin to explore the region, we can, nevertheless, detect a considerable fulness there, and he dreads it being pressed upon. The kidney is thus enlarged and tender. Consequently it gives two of the cardinal signs of inflammation. The man has nephritis on this side, set up, as we surmise, by the presence of a renal calculus, but whether it is a large or small one we cannot venture to say.

The notes run to this effect:—"When the pain first came on he passed some clots and also blood-stained urine. The last time he passed any blood was two months ago."

The man says that he has frequent desire to micturate. This may merely be due to the fact that his urine is alkaline, but the vesical irritation may be caused by the presence of a renal stone.

Putting together the facts that the kidney is inflamed and that the urine is alkaline, I think it quite probable that we shall find a foul abscess in the kidney when we reach it, and probably in that abscess we shall detect a stone which may be either large or small, but which will probably have a phosphatic shell.

Operation.—I cut down upon this kidney in exactly the same way as that by which I reached the last one, and exploring its posterior surface I can detect the presence of neither stone nor abscess, but I am struck by the great size of the gland. Then I get my finger round to the front of it but can find nothing abnormal except the size. There is nothing for it, then, but to loosen it from its bed and to bring it out on the surface that we may examine it deliberately by gently pinching it all over from end to end between the finger and thumb, as in the former instance. Still I can find nothing, nor can my house-surgeon. I therefore make an incision in its convex border and introduce my finger into the interior of the kidney. In so doing I evacuate no abscess, but I have the good fortune to detect two small calculi embedded in the roots of the pyramids. They are probably of phosphatic origin. I will pass them round that you may examine them. Notice that they are colourless and somewhat friable. The opening in the kidney shall now be stuffed with a long strip of gauze, and bulky absorbent dressings shall be applied as in the other case.

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AN ADDRESS

ON

WRITER'S CRAMP AND OTHER "OCCUPATION NEUROSES,"

(Illustrated by cases of Draper's Palsy, Pianist's Cramp, Machinist's Tremor, and Telegraphist's Cramp),

Delivered before the North-West Branch of the British Medical Association,

By THOMAS D. SAVILL, M.D., M.R.C.P.,

Physician to the West End Hospital for Diseases of the Nervous System.

GENTLEMEN,—There is a story told of Mr. John Abernethy that on one occasion when a lady consulted him for an acute pain in her arm, which "troubled her whenever she raised it higher than the level of her shoulder," he replied, "Then, Madam, why the —— do you raise your arm above the level of your shoulder?" I cannot vouch for the accuracy of this story, but I feel quite sure that this is not the kind of advice for which our patients come to us, and particularly those suffering from the class of disorder that is to form the topic of my address to-day. It is easy enough to cure, or at least arrest, an occupation neurosis by altogether ceasing to make the movements which have produced it. But with the great majority of these patients their daily bread depends upon their being able to continue to make those very movements, and they come to us to enable them to continue them. Herein lies at once the difficulty and the importance of the subject. Such cases are of fairly frequent occurrence in our every-day work as practitioners; and as I have quite a number of them under my care at the present time, I thought we might profitably study some of them together to-day.

The term "occupation neuroses" is applied to a functional disturbance of certain nerves and muscles which are produced by the excessive or improper use of the muscles necessarily employed in some occupation or trade. We shall have to consider very closely the meaning of the word "improper," as here used, because the causes and treatment of these maladies turn very largely on this. The conditions known as "writer's cramp" and "writer's palsy" are the most familiar illustrations, but there is a large series of conditions affecting telegraphists, typists, pianoforte-players, violinists, machinists, drapers, blacksmiths (hammer palsy), cigar and cigarette rollers, drummers, crochet workers, and persons of other occupations—any calling, in short, which necessitates the constant repetition of a certain muscular movement. I will first show you some illustrative cases, and then we can discuss the pathology, ætiology, prognosis, and treatment. Cases of writer's cramp and palsy are, no doubt, so familiar to most of those present that I have selected instances of other occupation neuroses to show you to-day.

1. The first of the four patients who have kindly come here to-day is forty-four years of age, and is by occupation a draper. He was brought to me some time back by Dr. Woodford, on account of the weakness and numbness of the right hand, which first began to trouble him some two and a half years ago. You will see that the weakness is limited practically to the thumb, and, if you compare the two hands, you will see that he has a definite wasting of the right thenar eminence; it is not great, but there is no doubt about its existence. This wasting is a somewhat rare and a peculiarly interesting feature, because it shows that in this case, at any rate, there is a definite degenerative lesion of the lower motor neurons connected with this group of muscles. He has also slight anæsthesia of the dorsum of the thumb, and I wish particularly to point out this numbness, because from the point of view of diagnosis it is important. Of course the question which first arises in the mind is whether it is a case of commencing progressive muscular atrophy, which, as you know, takes its origin in the thumb. But in that affection there is no alteration of sensation of any kind, and although he has been under observation for nearly a year, he has not exhibited any other symptom of progressive muscular atrophy, and his left hand is perfectly healthy. Anæsthesia is not, as a rule, met with in occupation neuroses, but in this case it is quite readily accounted for by the pressure of the scissors on the digital branches of the radial nerve. An atrophic flaccid paralysis of the kind before us points infallibly to a lesion of the peripheral nerve or its nucleus of origin. On examining the electrical reactions we find

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that the patient has a slight diminution in the faradic contractility of the muscles of this thumb, and as regards galvanism, A.C.C. is very nearly equal to K.C.C. (instead of K.C.C. being greater than A.C.C., as in health); and this confirms the idea just expressed as to the position of the lesion. There is no history of syphilis; and without going into the details of the history, practically all the usual causes of neuritis are excluded. There is no doubt therefore that the case is one of "scissors palsy." He has necessarily used his scissors, the short, clumsy scissors which he now shows you, a great deal in his business. In these cases it is not so much a question of the severity or power of the muscular movement—the actual strength employed may be very small,—it is the continual and, if I may use the term, the clumsy use of the muscles—using them in a strained position for a long period of time—which does the mischief. For instance, I purpose to show you to-day a young woman with telegraphist's cramp, which has been set up by nothing but the repeated pressing of a small button for telegraphing; quite a small and insignificant movement in itself, which would not represent a score of foot-pounds of work in a whole day. But to return to our first patient. He has improved by resting these parts, that is to say, he has left off the movement which produced the palsy, using his left hand instead, and he has had applications of the constant current every other day. He has also taken malt and cod-liver oil, which is, in my belief, an excellent nutrient tonic for the nervous system. This patient has certainly improved under these measures, but it is doubtful if the atrophy will disappear entirely.

2. The next case is that of a young woman æt. 28, who is a machinist. In order to sew embroidery, she has to turn a wheel which is attached underneath a table, now in one direction, now in another, the hand and forearm being during the process in a very strained position. It is this "strained position" which is such an important factor in the causation of her case. She came to me a few weeks ago, complaining of "weakness" of the right hand, which had lasted for some fifteen months. On examination I found that there was visible wasting on the ulnar side of the forearm and in the flexors of the thumb, considerable weakness in the grasp of the right hand, and marked tremor of the first two fingers and the thumb. The tremor was a fine rhythmical one which came on whenever she made any movement with that hand. Occasionally she has a painful stiffness, but there are no sensory changes, and no tonic contraction so far as I have seen. As regards the electrical reactions in her case, there is a slight diminution to faradism; that is to say, she has only one of the features of the reaction of degeneration. She has, you see, a flaccid atrophic paralysis of the muscles on the ulnar side of the forearm and of some of the muscles of the thumb—the physiological group of muscles which is employed in the particular movement made when she works her machine. She is having a descending constant current, but it is too soon to say whether she has improved or not. The best way to apply electricity to these cases is to put the limb in a bath. A big jug will do, the negative pole being put at the bottom of the jug and the hand put in the water, without touching the metal plate or the wire, the positive pole being placed at the back of the neck. This should be done for ten, gradually increased to thirty, minutes daily. She has also taken malt and cod-liver oil. There is a neurotic element in her case; she has been troubled with headache at times, and has had "globus" and other symptoms of hysteria.

The prognosis of occupation neuroses is, generally speaking, good, and much can be done for them by careful treatment; but I am bound to say that neither of these cases offer a very good prospect of complete recovery. I am glad to be able to show them to you, because atrophy—which exists in both, and which is the most unfavourable feature in their cases—is not, as far as I am aware, mentioned in text-books as being associated with occupation neuroses. But, gentlemen, you can see for yourselves that it undoubtedly does occur in some cases, and my belief is that if we had the means of measuring small degrees of muscular wasting, it would be found in nearly all cases in which the muscles remain flaccid. Moreover, the occurrence of this atrophy throws, as we shall presently see, considerable light on the position and nature of the lesion.

3. The next case is that of a woman æt 32. She is a music teacher by occupation, and she

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was sent up to the hospital by a doctor at Dover. She has been in the habit of playing the piano four or five hours every day. She is dependent on this for her living, and her condition, which is a very unhappy one, has been going on for fourteen months. She will show you the position which the fingers of the left hand assume, owing to an involuntary spasm, after she has played the piano for a very short time. The first two fingers become flexed and stiff, and this quite prevents her from continuing to play. Gentlemen, this is a very curious position, and for a long time it puzzled me why only one hand, and why only two fingers of this hand, should be affected in a pianist who uses practically to the same extent all the fingers of both hands. But on inquiry I find she has also played the violin a good deal, and the two fingers of her left hand assume the cramped position which they take when she plays the violin. It is, in short, a case of "violinist's cramp," only the spasm is determined by piano-playing. At first it came on only at this time, but it is now also determined by other movements as well, and her left hand is weak for everything. She has suffered for several years from serious derangement of the stomach (gastric atony and gastroptosis), which accounts for her general appearance of malnutrition; but there is no localised atrophy of the left hand or arm as far as can be seen. It is more than likely that the toxæmia which results from the gastric condition plays a very important part in the causation of her occupation neurosis. She has been under my care since January; we have treated the gastric disorder as best we can,* and she is having galvanism.

4. The next case is one of telegraphist's cramp occurring in a well-built young woman æt. 27, who has been employed in the Post Office. She complains of "weakness" of the right arm, which she says came on somewhat suddenly two years ago. In point of fact there is no weakness, but she is unable to use her right arm for working the telegraphic instrument, because effort to do so gives her acute pain, which generally begins in the "shoulder," and sometimes shoots down the arm and up the neck. In her case it is the muscles of the shoulder which are mainly affected by cramp; and chiefly the muscles which hold the shoulder up, the trapezius and deltoid. This we know by the position of the pain, for there is no visible change in these muscles. In addition to the pain produced by a particular action, she has more or less constant pain of a neuralgic kind in the same situation, which is markedly aggravated by damp weather. The telegrams from all parts of London pass through the General Post Office, and the operators are expected to transmit about twenty-five words a minute. The movement consists simply of pressing a small button very rapidly (it is known as the "dot and dash" system), *the arm being extended all the while.* It is chiefly the stretching out of the arm which puts the strain upon the muscles of the shoulder that has caused the trouble in her case. When this pain and inability to use her arm for transmitting telegrams came on, about two years ago, she was transferred to another department. But this did not end her troubles, for six months later she found herself unable to write on account of the severe cramp-like pain, much of the same kind as that felt in telegraphing, which any attempt *to write* produced. Meantime she had learned to use her left arm for transmitting telegrams, so she returned to her old work. But she had not done this for six months when the same symptoms appeared in the left shoulder and arm. Nothing daunted, she learned to write with her left hand; but unfortunately this is now beginning to produce the spasm, and she now has telegraphist's cramp and writer's cramp on both sides. There is no discoverable atrophy anywhere, and she can use both arms for all other movements, excepting those specified, though she states they are not as strong as they used to be. She is in excellent general health. Some improvement has lately taken place under the use of galvanism, malt extract, and a mixture consisting of Sodæ Salicyl. gr. x, Tinct. Nucis Vom. ɱv, Am. Brom. gr. x, and Tinct. Gelsem. Semp. ɱv, ter die. But she has only been under treatment a very short time; and the rapid reappearance of the malady in other parts bodes no good. It seems to indicate a very potent predisposing factor in her case, which may be difficult to deal with.

These are very good examples of the sort of cases which one meets in everyday practice,

* Abdominal support, and finely divided concentrated food, mainly consisting of proteids, with as little farinaceous food as possible.

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and you will observe that the continual over-use of a certain group of muscles is apt to produce five symptoms—at first localised to one part, and only affecting a certain movement, but tending ultimately to spread to other muscles and to involve other movements. In order of frequency, and in my experience very generally in order of development, they are as follows:—(1) *stiffness, cramp, or tonic muscular spasm*, which is generally accompanied by (2) *pain*. In the great majority of cases it is the combination of these two conditions which causes the difficulty. The pain is most probably always due to the excessive muscular contraction either of the whole or part of a muscle; it is, in short, "a cramp." If there be no muscular spasm there is rarely any pain; but it does not follow that pain always accompanies the spasm. (3) *Weakness*, rarely amounting to actual paralysis is the third. This may be, as in the cases of the draper and the machinist respectively, a flaccid paresis. The patients often describe all their difficulties collectively as a "weakness" because they are unable to perform a certain action; you will remember that the telegraphist did so. But we must be careful to distinguish paresis from spasm, for their treatment is very different. (4) *Tremor* may be present, as in the machinist. Sometimes there is a clonic spasm, and still more often an unsteadiness of movement—a difficulty of directing the limb. (5) In the early stages and throughout the course of a large number of cases, there is no *apparent* alteration of nutrition; but when there is paresis it may be accompanied by *atrophy*, and when spasm is present *hypertrophy* may ensue. One of the most notable cases in my experience in which hypertrophy had occurred was that of a clerk æt. 31, who consulted me in July, 1899. He was said to have had one or two attacks of influenza, but otherwise he had previously been quite healthy until January, 1897. At that time he became aware of a spasm or cramp in the right forearm whenever he had been writing for about an hour or so. In the course of the following year this increased so much that he was compelled to substitute a typewriter for his pen. Then, as frequently happens, typewriting also produced the same "cramp" in the forearm after the machine had been used for an hour or two. Later on, about a month or two before I saw him, the cramp or spasm became more or less continuous, and he found a difficulty in using a spoon and in lighting his pipe; any movement, in short, which required delicate manipulation, determined or increased the spasm. When I saw him in July, 1899, the moment he attempted to write all the muscles of the forearm became as hard as iron, each muscle standing out like a rigid band. He could, nevertheless, continue writing for five or ten minutes by holding down the right forearm with his left hand, otherwise it would begin to "jump." There was a difference of half to three quarters of an inch in favour of the right forearm; the measurements being—left, 10 inches; right, 10⅝ inches. The dynamometer showed—right, 76; left, 66; and the grip of the right hand was obviously very powerful. I prescribed for him bromides and absolute rest from writing for six months; meanwhile to learn to write with his left hand. When he resumed his occupation, I impressed upon him the necessity of holding his pen more loosely and freely; because the cause in his case was quite as much a faulty method, as excessive writing. The patient went abroad, and I do not know what was the sequel to the case.

This was an illustration of hypertrophy; the cases of the draper and machinist were instances of atrophy. There may, as we have seen in these two cases, be some electrical changes. In most descriptions of these maladies there is said to be no electrical alteration, and certainly it is only in rare instances that they are sufficiently pronounced to be demonstrable. But you know, gentlemen, how difficult it is to detect slight alterations of electrical contractility, which depend on so many varying conditions. In most cases of paresis I believe there is a slight degree of the reaction of degeneration, though it may be difficult to demonstrate. These, then, are the five symptoms met with in occupation neuroses, and in most cases they appear in the order I have just given, though one or other stage may be ill marked. If the spasm and pain are pronounced, the disease will probably be arrested at this stage, because the patient is compelled to cease his occupation; but if they are not pronounced, paresis and perhaps obvious atrophy supervene before the patient is aware of the gravity of his case.

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The *diagnosis* of these conditions is not difficult, by reason of their association with the occupation. But there are many organic and functional disorders which may be mistaken for writer's cramp at their outset. Peripheral neuritis, slowly oncoming hemiplegia, and palsy, and even disseminated sclerosis may thus be mistaken. But in all of these other maladies careful inquiry shows that even from the first the symptoms were not limited absolutely to the act of writing or other occupation. Many great writers imagine they have writer's cramp, from the stiffness produced after writing for a long time, but such cases do not conform to the above description.

The *pathology* of "occupation neuroses" is admittedly obscure, but I hope that some of the cases I have shown you to-day will help to throw some light on the condition. No gross lesion has yet been found in these cases, though that is not surprising when we remember how rare are the opportunities for microscopic examination. That there may be, and sometimes is, definite structural alteration, is shown by the existence of the atrophy and of the electrical changes, as I have already remarked in connection with the cases of the draper and machinist. Theoretically, the lesion may exist in one of two places, either in the muscle itself, or in its nerve-supply, or, more strictly speaking, in the lower motor neuron, *i. e.* the part of the nervous system which lies between the anterior multipolar cells in the anterior horns of the spinal cord and the termination of the nerve in the muscle. The former, I think, may be excluded, for although it has been suggested that the products of muscular contraction by their collection may explain some of the cases, this would not explain all of the five various clinical phenomena above mentioned, whereas the hypothesis I am about to present to you would readily do so.

We know, by a process of reasoning into which I cannot enter on the present occasion, that whereas an *irritative* lesion of the cerebral cortex gives rise to spasm, a *partial or incomplete destruction* will give rise to muscular tremor; and finally, a *destructive* lesion of the same structure produces paralysis. Now this is precisely the order in which we get these same symptoms in occupation neuroses; first, we get spasm or cramp (irritation), which generally causes the patient to give up the over-use of the affected muscles, so that most cases rarely get beyond this—the irritative stage. If he persists we may get tremor (partial destruction); and if he still continues, we get flaccid paralysis (complete destruction). We know that destructive lesions of the lower motor neuron produce flaccid atrophic paralysis—just what we get in the rare cases I have shown you; *i. e.* rare in the presence of the atrophy. And why should we not reason from analogy as regards the nature of the lesion in the anterior multipolar cells, which have the same relation to the lower motor neuron as the cells of the cerebral cortex have to the upper motor neuron. As regards the atrophy, since it only affects one or two muscles, it probably remains undetected unless the muscles affected are quite superficial and the wasting unusually marked, as in the draper and machinist. The question how does merely excessive use produce these lesions is not easy to answer. May it be that the anterior multipolar cells are poisoned by the products of their own functioning? This is possible, but we do not know. There are, however, two laws, the one physiological, the other pathological, which apply here, and certainly help us to explain. The first is that increased function, *within certain limits*, gives rise to increase of structure. This was illustrated in the case of "writer's cramp" which I mentioned to you. The other law is sometimes called Edinger's Law, though it was well known before he adopted it, and is to the effect that prolonged *forced* functioning of any nerve structure leads in course of time to atrophy of that structure and its ultimate destruction, and overgrowth of the structures around (*e. g.* the connective tissue). This, I doubt not, is what has taken place in the anterior multipolar cells in the cases of the draper and machinist. They are probably irretrievably atrophied.* We see an illustration of this same law (Edinger's, so-called) in tabes dorsalis. It seems, at first sight, strange that tabes dorsalis, a degenerative lesion, should occur more frequently in men than in women, and in men at the most active and most vigorous period of their life, namely, from twenty to fifty. And finally, why should it occur particularly in those men who, like

* Cases of recovery are possibly accounted for by other cells taking on the function of the damaged ones.

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commercial travellers, canvassers, or collectors, use their locomotive powers a great deal? The reason is that vigorous men of these classes submit their muscle-sense neurons (the structures which are affected with the degeneration in tabes dorsalis) to prolonged forced functioning, and thus render them specially prone to the degeneration which results from the syphilitic poison; by-and-by they atrophy, and sclerosis occurs around them.

Before concluding the pathology, I would remark that although there are good reasons for believing the stages I have indicated—cramp (with or without hypertrophy), tremor, paralysis, and atrophy—do occur in this order, nevertheless, in long-standing cases one or other of these stages may be so ill marked that it may appear to be wanting. Thus in some cases the disease may proceed rapidly to paresis, or even atrophy, without the initial cramp. This has always seemed to me to depend upon the various contributory or predisposing causes which may be in operation. If, for instance, a patient inherits a proneness to degenerative lesions of the nervous system, paresis will probably rapidly supervene. If, on the other hand, he is the subject of the gouty or rheumatic diathesis, or some other persistent toxæmia, the cramp will probably be so marked that he will be prevented from using the limb, and unless he shuts his eyes to its warnings, the disease will not proceed to the subsequent stages.

As regards the *ætiology*, prolonged forced exercise is, of course, the leading factor, but by no means the only one. It is a point of more interest than importance to inquire how long it is necessary for a person to follow a certain occupation before an occupation neurosis results. The first patient had used scissors for many years, the second had worked her machine for only two and a half years, the third had played the violin an average of two hours and the piano for three hours a day for two or three years, and the fourth had employed about half her working days in telegraphy for five or six years. But you will generally find that a faulty method is a far more potent factor than long pursuit of the occupation. But besides excessive use and faulty methods, there is very generally in these cases a neurotic tendency, either inherited or acquired, which plays a most important part in the ætiology. Evidences of it exist in all the cases exhibited to-day. Among inherited predispositions, alcoholic parents account for a good many; sometimes there is a family history of "fits," insanity, creeping palsy, and the like. A neurosis of this kind and the rheumatic diathesis are strongly marked in the telegraphist, both in herself and in her family. Unhealthy modes of life and a state of malnutrition in the individual predispose in some patients—though we must not attribute too much importance to the fact that writer's cramp occurs largely among clerks, who spend nearly all their time indoors; their mode of life may contribute to the causation, but their occupation is the determining factor. Anæmia is a potent predisposing cause and, therefore, all the conditions attended by it; so also is syphilis, and many cases date from an attack of influenza. Toxæmia, dependent on gastric disorder, as in the pianist, is met with only occasionally.

The *prognosis* of these cases depends on several circumstances. In the first place, it depends on the duration of the malady before means are taken to remedy it. All these cases have lasted a long time, and, therefore, their prognosis is less hopeful. Where one can get the case early and bring about a modified use of the muscles with plenty of rest to the structures involved, a great deal can be done for it. Another point—though, strange to say, of less importance than the others—is the degree of the mischief, *i. e.* the stage which the case has reached. Thus simple spasm, and even tremor, is somewhat more amenable to treatment than paralysis and atrophy. Atrophy is hardly ever recovered from, though even here by appropriate treatment we may arrest the disease, and by the gradual substitution of other motor neurons the patient may be able to resume his occupation. If the cramp or weakness is only observed in one particular act, such as writing, the prognosis is much more favourable than when it is present during other or all the movements of the limb. The presence of marked electrical changes indicate definite structural changes in the nervous apparatus, and the case is not so hopeful. Of the cases I have shown to-day the least advanced is that of the piano-player. But in her there exists a permanent source of malnutrition and

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toxæmia in her intractable dyspepsia. The existence of such contributory causes adds, of course, to the gravity. But the means of the patient, and the possibility of his carrying out the necessary treatment are also of much importance. Moreover, it is well, gentlemen, never to commit yourselves to a prognosis until you have had an opportunity of observing the effects of treatment directed to the relief of the condition.

The *treatment* I have referred to incidentally, but the general plan adopted will depend somewhat upon which of the five conditions constitutes the leading feature.

1. If it be *spasm* (accompanied, or not, by hypertrophy), *pain*, or *tremor*, with which we have to deal, rest and sedatives are our chief means. Now by rest I do not mean cessation from all movement, although absolute cessation from that particular act is, for a time, indispensable excepting in the very early stages of the malady. Nevertheless, when met with in an early stage, and afterwards when resuming the occupation, much may be done by *modifying the method* of performing that particular act. Thus in writer's cramp one can do a great deal by getting the patient to hold the pen loosely, freely, and in a position which is not cramped. It is also serviceable to get him to write several times daily a page of very large and very sloping pot-hooks. In that way he will gradually get into the habit of using the pen in a way which does not produce the disease. It is a noteworthy fact that practically all the cases of writer's cramp which I have seen—and this amounts now to several score of cases—have held their pens in an improper, or, at any rate, awkward fashion. If the affection has gone too far, the patient must use a type-writer only, at any rate for a time, or else learn to use the other hand. This also must be done in moderation, else the patient will develop "typist's cramp," as did the patient with hypertrophy. The difficulty is that the muscles affected are nearly always those upon which these people depend for earning their living, and therefore giving Abernethy's advice does not cut the Gordian knot. By the exercise of a little common sense and ingenuity the great strain thrown on a particular group of muscles may often be relieved. For instance the patient with telegraphist's cramp derives some assistance from the use of a specially made support adjusted to the right height beneath the wrist Systematic exercises directed to bring each individual muscle equally and successively into action for short periods at frequent intervals during the day, is a method which, in competent hands, has met with considerable success. This plan is specially successful when writer's cramp appears to be attended by an undue strength of some muscles and weakness of others. Gymnastic exercises are often useful—always with very light or no apparatus. Did time permit other means could be mentioned, but suffice it to say that, just as correcting faulty methods of voice production will save school-teachers from all sorts of laryngeal troubles, so will improved methods save, and sometimes relieve, patients from occupation neuroses. As regards drugs, sedatives, especially the bromides, are certainly useful in this class; hyoscyamin (for tremor), and even chloral (in severe cases) may be required.

2. When *paresis* or *atrophy* are present the treatment must be somewhat different. Here galvanism and massage are the remedies *par excellence*. The method of applying the former has been referred to, and it is twice as efficacious if followed by massage of the limb. The remarks on modifying the method of the movement apply also here. Tonics, and good, liberal diet are also indicated. With regard to nutrition, I have very great faith in cod-liver oil and maltine for wasting nerve disorders; it seems to have some special but unexplained action for good. *Our special attention should be directed to seeking and treating any concurrent condition or contributory cause, such as those I have mentioned.* The improvement in the telegraphist's case was, without doubt, partly due to salicylate, for her progress was less rapid when this was omitted. I sometimes find it has been overlooked, and when the remedies are directed to it, the patient makes rapid progress which hitherto he never dreamt of.

You will observe, gentlemen, that this is an eminently curable complaint, and it helps therefore, once more, to redeem our speciality from the charge, so unjustly (as I believe) levelled at it, that maladies of the nervous system are incurable.

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CLINICAL LECTURES

ON

THE VARIOUS FORMS OF INTRA-ABDOMINAL SUPPURATION.

Delivered at Westminster Hospital,

By A. H. TUBBY, M.S., F.R.C.S.,
Surgeon to the Hospital.

LECTURE IV.

APPENDICITIS (*continued*).

GENTLEMEN,—To-day we have to deal with the subject of PROGNOSIS. And the important point is to realise that appendicitis is not a disease which is dominated by statistics; that is to say, you cannot lay down certain absolute rules about any kind of case by reference to statistics. All that one can say is that you may obtain certain broad results if you take a sufficient number of reliable figures. By doing so you may be able to eliminate the untrustworthy ones to some extent. Physicians claim that 80 per cent. of the cases get well without operation, and I think I may say that the interpretation is that 80 per cent. of the cases which pass through the medical wards get well at the time. Of course there is a great fallacy in that statement, and in this way:—A patient comes in with appendicitis, and recovers, under medical care, of his attack of appendicitis, and goes out of the hospital. He may remove to some other part of the country, and he has a recurrent attack. This, of course, vitiates the original statistics; or he may get an acute attack, for which he is operated upon in a surgical ward, and either recovers or dies. So we may say that the estimate of 80 per cent. of patients who get well without operation is not altogether reliable. Some physicians are inclined to think that appendicitis is, on the whole, a comparatively mild disease; but it is not so, as you will agree when you come to hear what surgeons have to say about it. Surgeons give a report of it which is pessimistic; and, of course, they are influenced by what they see, because the surgeon is often called in just at the end of a very severe illness, when the patient is *in extremis*, and is asked to operate. If he is a wise surgeon he will not consent to do so, feeling that by so doing he cannot do the patient any good at that stage. I affirm that the medical statistics on the subject cannot be reliable unless the entire life-history of the patient is traced out—that is, unless it is recorded how many subsequent attacks occurred, and whether the patient did or did not die subsequently of appendicitis. Surgeons have been so much impressed by the virulent nature of the disease, that in America there is a tendency to operate upon appendicitis in any stage, that is upon all inflamed appendices. It is quite certain that it is not right to operate upon all such appendices, nor is it right to leave them all untouched. Again the question of judgment comes in.

The points which ought to be considered under the heading of prognosis are as follows:—(1) How many cases recover under medical treatment alone, and does surgical interference increase the mortality? That, you see at once, opens up a very broad field. If surgical interference increases the mortality, the physician is justified; if it decreases the mortality, there is much to be said for surgical interference. As I have said, it is stated by physicians that 80 per cent. of the patients recover from the attack under medical treatment alone, and surgeons claim that of the remaining 20 per cent. one half may be saved by opening the abscess; and a small proportion of the remaining half, or 10 per cent., that is those with perforation and diffuse peritonitis, recover after operation. The American surgeons say that of 10 per cent. with diffuse peritonitis 3 per cent. will recover if operated upon; but I think that is rather too high an estimate. The ultimate outcome of statistics is that the medical mortality of 20 per cent. is reduced to something under 10 per cent. by surgery. (2) Upon what conditions does success of surgical treatment depend, and what are the results? That is to say, what conditions, in a given case, if the surgeon is called in at the proper time, will conduce to the patient's recovery. The conditions one has to take into consideration are, first of all, the state of the parts affected, as to whether the appendix is gangrenous, perforated, or whether there is acute peritonitis present. I do not think I need enlarge after what has been previously said, except to say that the gangrenous cases come on very rapidly, and run a very severe course; and so do perforative cases, while acute peritonitis makes its appearance very early. But some other factors must be taken into consideration, namely, the period of the illness

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at which operation is undertaken, and how soon after the onset of the virulent attack; for every day makes a very great difference in this respect. I might have given you statistics showing that a certain number of such patients recover if operated upon in the second day of the attack, a small number if operated on on the fourth day, and practically none if operation be not attempted until the fifth day. Then the ability of the operator is a factor, and this no one can measure except the man himself and his critics. There is also required a thorough knowledge of the technique of abdominal surgery. All these points must be taken into consideration in estimating the prognosis of a particular case. For instance, a skilful surgeon will get a better result with a given case than a surgeon who is less skilled.

The conclusions which are warranted by the facts are as follows:—(*a*) If operation is necessary, the sooner it is done the better, and the greater are the chances of recovery. (*b*) The basis of the decision should be the character of the attack, and not the number of days or hours of the illness. Do not say, "This is the fourth day or the fifth day, and therefore it should be operated upon;" take the general condition of the patient and the state of the temperature and pulse, and decide upon these grounds. (*c*) If the case is such that you seriously think an operation may be necessary, I would advise that the operation be done at once, because, in all probability, in such a case as that operation will have to be done eventually, and nothing but harm can come of delay. Therefore I think that if, in your opinion, a case is probably one for operation, the probability settles the matter, and it is high time to call in a surgeon. The risks of abdominal section are not great, and the good results to be gained are very considerable.

(3) The next point in prognosis is, How many cases relapse? The probability of relapse in cases treated medically is 30 per cent., and that, you will see, seriously detracts from the 80 per cent. of cases said to recover. When a large number of cases are traced, at least 30 per cent. of them are found to relapse. You will often be asked about this point by your patients, and you should be well informed thereon.

(4) Can better results be obtained than at present by treating all cases surgically as soon as the case is diagnosed? That is to say, would you take out every diseased appendix that is brought before your notice. Progressive surgeons say "Yes;" conservative surgeons say "No." The judicious surgeon will not dogmatise, but he will consider the facts of each case. In America so much have some surgeons become impressed with the virulent nature of appendicitis that I believe they remove every appendix, however slightly it may be inflamed. The swing of the pendulum is noticeable in the tendency to remove all appendices, many unnecessarily, and is a contrast to the state of opinion some years back.

Let us now consider TREATMENT. In these cases of appendicitis the surgeon should be the "operating physician." As I said in a previous lecture, all cases of appendicitis, in my opinion, should be brought at once to the surgical wards, and be treated by the man who may have to operate; and surely the man who operates is he who best knows when to operate. Consider what may happen at a distance in the country. You may have a case, and half a day may be consumed in sending for a surgeon, and during that time the abscess bursts into the general peritoneal cavity and produces peritonitis; and in that case, when help arrives the case may be hopeless. Therefore I do not think it is good to regard these cases as medical first and surgical afterwards; it is too much in the nature of "high specialism."

With regard to the medical treatment, the first necessity is absolute rest in bed. As those who have suffered know, the slightest movement aggravates the pain immensely and increases the amount of effusion. If the patient move about he may rupture an abscess or a cystic appendix, and the contents may be diffused over the abdomen, so causing acute general peritonitis.

The next point is the relief of pain This is effected by fomentations and full doses of tincture of opium or morphia. As to what full doses are, I believe 15 minims of tincture of opium is a full dose for an adult, or half to one third of a grain of morphia. You should give the opium once every four to six hours until the pain is relieved. If vomiting is present no food should be given by the mouth When the vomiting has ceased you can give small quantities of fluid in the ordinary way—*e. g.* hot beef-tea or barley-water, or toast and water, but no iced drinks should be given; and the prevalence of appendicitis in America may be due to the perni-

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cious habit of taking iced drinks. The question of purgatives is all-important. If the onset be acute, purgatives must be strictly avoided. But if the patient has had four or five previous attacks, and the present one from which he is suffering is apparently very mild or slight, you may give a purgative in the form of one grain of calomel—not more. If that one grain produces no effect, do not give any more purgatives or enemata, but wait. If you are in doubt, always err on the safe side of preferring constipation to purgation. You are in the main right in not trying to produce an evacuation in a supposed case of appendicitis. When the appendicitis has passed its acute stage, and the bowels reassert themselves, about the fifth or sixth day, you may order a glycerine enema. Solid food should not be given until the tongue is clean and the temperature has fallen. When the case looks healthier you may give small quantities of toast and peptonised milk, and cream and fish, and later on fowl and meat.

For the relief of the local swelling and pain some surgeons advise the use of leeches. The only objections I have to leeches are: First of all, they are horrid things to apply to children, who get very frightened; and, secondly, the idea is prevalent in some quarters that by applying them you may diminish the amount of effusion by drawing off blood-plasma; and, thirdly, leeches have been gratuitously applied when pus is present, which is foolish. Either fomentations sprinkled with opium or alcoholic solution of menthol give relief.

When the bowels have started to act freely again it is advisable to keep the patient's intestinal canal as antiseptic as possible. For that purpose salol 10 grains, β-naphthol 5 grains, or salicylate of sodium 20 grains can be given, but only when the bowels are acting freely. It is very important to impress upon these patients that they are not to get about too early, and when they resume ordinary life they must have a pad and bandage over the right iliac region, tightly applied.

With regard to the prevention of further attacks, for many months, and even years, after the attack the patient should regulate his diet, since indiscretion in the matter of diet often means a relapse. The articles of diet these patients should be especially told to avoid are shell-fish, lobster, and crab; and they should also avoid all fruits with small seeds in them, and not eat cheese, pork, veal, nor salad. It is of very great importance to impress upon the patients the necessity of keeping the teeth in order, because there is no doubt that the onset of other attacks has been cut short by having the teeth properly regulated. Patients should take simple meals, and rest for half an hour afterwards, keep the bowels open, and avoid cold and excessive exercise.

With regard to operative interference, you may have to operate for appendicitis under three conditions:—(1) localised abscess; (2) diffuse peritonitis; (3) relapsing or recurrent appendicitis.

First of all as to operation for localised abscess. The size and position of the abscess vary considerably. In the case which was operated on last week I incised two inches from the anterior superior spine; and when I operate presently on the case you have seen, the centre of the incision will be made somewhat above the anterior superior spine and more towards the back, because it seems that the child has a peri-renal abscess. The abscess may be either a large and superficial one, or it may be a small and deep one. When you divide the transversalis fascia, if the abscess is in the ordinary position you recognise it by the opacity of the peritoneum. If there be a large abscess present, at the end of the first week you find pus in one of two places, either in the retro-peritoneal tissue in the iliac fossa, or behind the anterior abdominal wall, bounded in front by the transversalis fascia. It is very important when you open these abscesses not to plunge a director or trocar into them suddenly, because it often happens that an abscess is in the midst of a number of coils of intestine, and if you push your director suddenly into the region you may wound coils of intestine and set up a fæcal fistula. The opening through the peritoneum must always be made in the opaque area of the peritoneum, and care must be taken not to incise across the boundary line of adhesions limiting the abscess. Many deaths are due to neglect of this precaution.

The usual method of treating these cases is to make the incision through the abdominal wall layer after layer, cutting through all the fibres in the line of the incision. But a large number of these operations for appendicitis are found to be followed by hernia. In fact, no less than 85 per cent. of the cases of appendicitis, according to statistics, show weakness of the abdominal wall

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or distinct ventral hernia after operation. The method advised is to make an incision three or four inches long over McBurney's point, then go down to the fibres of the external oblique, and instead of cutting straight across them, split them in the direction of the fibres and pull them apart. Then you come across the internal oblique and tranversalis muscles and divide them parallel to the fibres. In that case you cut no muscle-fibres at all; all you will have done is to separate them. You will readily appreciate the value of this as regards firm healing and support to the abdominal wall afterwards. The operation takes much longer and is more difficult, for the reason that when you get down to the abscess or appendix you will be working at the bottom of a deep pit; yet you must be encouraged by the fact that the patient will afterwards have a good abdominal wall.

Before the peritoneum is opened clearly make out the position of the abscess; carefully open it and evacuate the pus. Do not try to define the deep limits of the abscess. If you do you may break down adhesions, for they are often of the thinness of wet brown paper; and remember it is very easy to put your finger through one of them and into the general peritoneal cavity with disastrous results.

Another way in which pus is let into the general peritoneal cavity, is that the incision through the parietal peritoneum is made across the boundary line of the abscess, so the general cavity becomes infected by pus which flows into it.

Should the appendix be sought for? Not unless it present itself, then it may be removed. Some surgeons always seek for the appendix under the impression that the opening of an abscess such as this is an incomplete operation. But I think in the cases in which the appendix is sought for and removed the mortality is somewhat higher than it would be otherwise. My advice is, let the appendix take care of itself, and, if necessary, remove it later.

If, however, it be decided to remove the appendix, it is very important indeed that you should treat the stump properly. The way in which an appendix is amputated is as follows:—Place a ligature on the appendix near the cæcum and make an incision round the appendix, about one inch from the cæcum and just through the peritoneum. Then draw up the peritoneum nearly as far as the cæcum, and cut through the submucous and mucous coats. Therefore, there is now a sleeve of peritoneum. You then, with a sharp spoon, scrape out the mucosa and submucosa of the appendix, and take care to disinfect it with pure carbolic acid. And then draw the sleeve of peritoneum over the stump and suture it, and the operation is complete.

When you operate for acute peritonitis you do it in the same way as for abdominal section, but it is very important to obtain thorough drainage, therefore always put a glass drainage-tube in the pelvis; and if the case is severe put a glass drainage-tube through either flank.

For recurrent appendicitis the line of incision is made with its centre over McBurney's point, midway between the umbilicus and the anterior superior spine. The various layers of the abdominal wall are separated by the method I have indicated, that is to say, parallel to the muscular fibres to prevent ventral hernia; and you should treat the stump of the appendix in the way mentioned above. As a rule, if the operation is well and carefully done no drainage is necessary, and the wound will heal up uninterruptedly, so that the patient is often able to go out of the hospital well in a fortnight.

At the next lecture I shall deal with the interesting subject of subdiaphragmatic abscess.

MR. STONHAM'S "MANUAL OF SURGERY."

Cellulitis of the Neck—(Angina Ludovici).

Cellulitis of the deep planes of the neck may result from ulceration or sloughing about the mouth or throat, or from extension of a suppurative process in connection with middle ear disease or dental caries. It may also occur in connection with strumous glands. The inflammation usually begins at the upper part of the neck and extends downwards. In the worst cases it may spread to the superior mediastinum. Owing to the density

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of the deep cervical fascia the tension and pain are severe, and the former may cause difficulty in swallowing and respiration. Extension to the larynx and œdema of the glottis constitutes a formidable danger. Prompt incisions must be made and so placed that no important structure is damaged. Laryngotomy may be required if the disease spreads to the larynx. Cellulitis sometimes begins in the cellular tissue round the base of the tongue, and in such cases the swelling is centrally placed and symmetrically beneath the jaw. There is considerable danger of extension to the larynx causing sudden and fatal œdema; this may, however, usually be averted by an early and deep median incision.

Treatment of Railway Spine.

The patient should not be kept in bed, nor confined to a couch, as this will foster the idea that the paralysis and other symptoms are due to organic mischief. If there is any bruising or local injury, this may necessitate confinement for a few days, but as soon as possible the patient should get up. Massage and faradism must be employed in cases of paralysis, and, above all, the patient's mind must be at rest; he should be reassured as to his condition, and encouraged to use his limbs. Cold douching, fresh air, and residence in a quiet country place are beneficial. Plenty of food must be given, and tonics must be persevered with. Narcotics should be avoided if possible; but if any, the bromide of ammonia or chloralamide may be given. In hysterical cases it is often a good plan to remove the patient from his friends and place him with strangers.

Acute Suppurative Teno-Synovitis.

Prognosis.—The prognosis of life is good; but if the case has been neglected, and especially if the patient is very feeble and in ill-health, death may result from septic poisoning. In some cases general infection and secondary inflammation of the lungs proves fatal. The prognosis as to the future utility of the part depends upon the extent of the disease, and the promptness with which treatment has been carried out. The tendons may be bound down by adhesions, or they may slough, and in either case there is necessarily some degree of permanent stiffness, which will, however, ultimately be much improved by massage. Secondary hæmorrhage sometimes occurs when the sloughs are in process of separation.

Treatment.—The pus must be evacuated by early and free incision, and the finger must be fomented with boracic lint until repair sets in. The incision, when made in the finger, must be placed in the centre of the palmar surface, so that the vessels and nerves are not damaged. Care must be taken not to cut deeply enough to open the tendon sheath if this is unaffected.

Incisions in the palm must be so placed that the nerves and vessels are not damaged. They should be made in front of the palmar arch, in the lines of the metacarpal bones, and never transversely to the palm. Incisions in the forearm must also avoid the vessels and nerves.

When the incisions have been made, the application of pure carbolic acid to the diseased structures serves to cut short the spread of the inflammation. The limb must be enveloped in hot antiseptic fomentations, or placed in a hot arm-bath until all sloughs have separated and granulation is in progress. If a phalanx is necrosed, it should be lifted out so that the finger may, as far as possible, be preserved. In the worst cases, in which the part is totally disorganised, amputation must be resorted to; but this should never be performed while the disease is progressing, otherwise its spread to the stump is almost certain.

The six preceding paragraphs are taken from 'Stonham's Manual of Surgery,' which Macmillan & Co. have just published in three volumes. The object Mr. Stonham had in writing this manual was to present to practitioners and students a succinct account of modern surgery. The author must be congratulated, not only on having issued a very trustworthy work thoroughly brought up to the level of the most recent knowledge, but also on having set forth so concisely, completely, and lucidly, the results of his sixteen years' experience as hospital surgeon and teacher. The three volumes are well printed, profusely illustrated, and strongly bound, and of a handy size for holding when reading. To put the case in a few words, Mr. Stonham's publication is a model of what a manual should be, and Macmillans certainly made a hit when they persuaded the Senior Surgeon of Westminster Hospital to write this valuable addition to medical literature.

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A CLINICAL LECTURE

ON

CEREBRAL DIPLEGIA.

Delivered at the National Hospital for the Paralysed and Epileptic, Queen Square, London,

By JAMES TAYLOR, M.A., M.D., F.R.C.P.,

Physician to the Hospital; Physician to the North-Eastern Children's Hospital, and to the Royal London Ophthalmic Hospital, Moorfields.

GENTLEMEN,—The subject announced for my lecture to-day was cerebral diplegia, but I have thought it best to supplement what I have to say on that subject by showing you examples of allied conditions, cerebral, spinal, and muscular.

Cerebral diplegia is a name which is convenient, and it is applied to a rather definite class of cases, namely, cases in which there is evidence of disease on both sides of the cerebral hemispheres, so that, of course, there is paralysis on both sides of the body. The most common form of diplegia, speaking of diplegia simply as a paralysis affecting both sides, not cerebral diplegia, is the usual form of spastic paralysis. And associated with that there is a form of cerebral spastic paralysis to which the name "cerebral diplegia" is most frequently and most strictly applied. It is also spoken of sometimes as "Little's disease," after the eminent surgeon who was the first to describe it many years ago.

Cerebral diplegia is, as I have said, due to disease of both sides of the cerebral hemispheres, and there may be various forms of disease. The most common form of cerebral diplegia is that which is also known as birth palsy, and it is due to a condition arising at the time of birth, and is often associated with some difficulty in the labour. This form of diplegia may be such as to affect only the lower limbs. It may, on the other hand, affect not only the legs, but also one arm or both arms, and even the face may suffer. The most common variety is that in which only the legs are affected, and that is, strictly speaking, what is known as Little's disease. It is only in comparatively recent

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times that the nature of the condition which causes this paralysis has been clearly shown. In most cases this is a hæmorrhage from the meninges on to the surface of the brain. And if one remembers the distribution of the nerve-centres in the cortex of the brain, one can understand why it is that so often the legs are chiefly affected. I show you a diagrammatic representation of the brain. We have a symmetrical representation of the centres for the arm, and leg, and face on the two sides of the brain. You can thus understand how it is that a hæmorrhage occurring on the vertex of the brain may occur in such a position as to only affect the leg centres on each side, without really involving the arm centres at all. You can also understand how, if such a hæmorrhage spreads on one side, you may have both legs paralysed and only one arm. If such a hæmorrhage spreads on both sides you may have both arms and both legs affected, and it may spread to such an extent as to involve the face. In the majority of cases of diplegia, as I have said, the legs only are affected, and in such cases it is rare to get any mental complications. Patients with such paralysis are fairly intelligent, and in some cases are unusually so. On the other hand, when both arms are affected as well, there is often some impairment of the mental condition; that is to say, the mental state is not so good as it is in the ordinary child. You can understand that if you have a very extensive hæmorrhage spreading laterally, so to speak, you probably have it spreading forward, and if it does so it will involve the prefrontal area, which is probably, as you know, more especially related to mental processes. Sometimes cases are described in which you have hemianopic conditions; that is to say, conditions affecting vision owing to involvement of the occipital region, and you have also some degree of squint present, no doubt as a result of an affection of the area which is related to conjugate movements of the eyes, which is placed at the most anterior part of the motor area. Therefore with any extensive hæmorrhage you can see how it will not only extend to each side in that way, but it may also extend forward, and it may extend backward. But the most common form is that in which the paralysis is limited to the legs.

Besides this form of diplegia, in which we have a definite, what one may call traumatic, lesion associated with birth, we may have some degenerative processes attacking the cells of the cortex, and giving rise to similar conditions. What the underlying cause of such degeneration is is not clear, but in some cases there seems to be ground for supposing it may be related to congenital syphilis. But in other cases it is certain that congenital syphilis may be excluded. On the other hand, there may be some peculiarity about the cell which renders it liable to early decay and death, and in this way probably makes the disease analogous to some of those hereditary spinal diseases, such as Friedreich's hereditary ataxy, in which we suppose there is a similar liability to early decay in certain of the spinal structures. So here in certain cases of diplegia we have apparently a tendency in certain cells or groups of cells to early death and decay, and the early death and decay of such cells gives rise to paralysis, which varies with the position of the cells, and, of course, also varies with the degree to which decay goes on. In those cases, however, the paralysis is apt to be much more extensive than it is in the case of the common form, so that we very rarely have it limited to the legs. Much more usually is it extensive, affecting both arms and both legs, and also involving the structures on which mental processes depend.

Besides this form of diplegia, in children we have a very common form of paralysis known as infantile hemiplegia. It is called so simply because of its occurrence in the first few years of life, and it is given a separate name because of the presence of certain signs and symptoms at the onset of the paralysis, and after its establishment, causing it to differ from hemiplegia as it occurs in the adult. For example, the most common history in a case of infantile hemiplegia is that the child has at some time been seriously ill; it very often has been found to have had severe convulsions or one severe convulsion, and that it was at that time in danger of death. After the acute illness has passed off the child is found to be paralysed on one side. A certain amount of improvement takes place; the paralysis is of the ordinary type, and very rarely is there any sensory affection present, or if it is, it is not permanent. Sometimes hemianopia is said to be present, but in those cases which have been examined some time after such a condition has been stated to be there no trace of it has been found. The paralysis, therefore, is motor paralysis, affecting usually the arm

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more than the leg, and in that way resembling the ordinary form of hemiplegia. However, it differs in its mode of onset. That is to say, there is acute illness with either one severe convulsion or a series of convulsions. After the condition is established certain changes are associated with hemiplegia which mark it off as in some way different from the disease as it occurs in the adult. First of all, you have a very great interference with the movement, and consequently, I think, with the development of the affected side. So that in a well-established case of infantile hemiplegia, a few years after the onset of the paralysis you have the paralysed side very much smaller than the healthy side. It is often said that there is atrophy of the affected side, but I think that is not quite the correct way of putting it. It is not atrophy, because there has never been the actual growth there, but you have an interference with development, really a stunting of that side. Then you often have associated with the paralysis of the limbs certain involuntary movements of those limbs, the most characteristic of which is athetosis or mobile spasm, a condition which is rather difficult to describe, but when you have once seen it you cannot mistake it for anything else. I hope to be able to show you at least one example of the condition to-day. This athetosis consists in the paralysed limb or limbs undergoing a cycle of movements, slow and gradual, and not spasmodic, one movement gradually passing into another, the cycle beginning again, and then going through the same stages. That is by far the most common form of movement associated with infantile hemiplegia. There is one other form of movement which I am fortunate in being able to show you, a movement which resembles closely the intentional tremor of disseminated sclerosis, and occurring in the paralysed limb. I have only seen it occur in the arm. The peculiarity is that it becomes more exaggerated the more the patient tries to carry the fingers to any definite point, so that it may be quite a wild movement as the goal is reached.

So much for the cerebral cases. There are other forms of diplegia, namely, spinal, a class of conditions which ought to be considered at the same time as the cerebral ones. In children you may get, as a result of caries, or as a result of other forms of pressure, a spastic paralysis developed, which, as regards gait and other symptoms, you cannot distinguish from an ordinary case of cerebral diplegia. Spinal spastic paralysis from any other cause than caries is very rare in children; that is to say, the idiopathic form, so-called primary spastic paralysis, is extremely rare.

There is another form of paralysis which occurs in children which sometimes rather curiously resembles in certain features the cerebral forms, viz. the ordinary form of anterior poliomyelitis, in which you may have both legs affected, or both legs and one arm. It is quite different from the paralysis of cerebral origin, because it is a flaccid paralysis, and in the muscles there is no reaction to faradic current.

There are various forms of infantile paralysis. The ordinary form is that which depends upon inflammation of the anterior horns of the cord, and the consequent decay of them and of the correlated muscular structures. In some cases, however, apparently in poliomyelitis, you have severe pain along the course of the nerves in the paralysed limb, and in those cases, as was pointed out by Sir William Gowers a few years ago, there is every reason to suppose there is associated with the anterior horn affection some inflammation also of the peripheral nerves. There has also been described another class of cases, of which I have had the good fortune to see two at the Paddington Green Children's Hospital under Dr. Leonard Guthrie's care, in which the symptoms were those of anterior poliomyelitis, but in which the paralysis was associated with a very definite degree of pain, in which also the paralysis cleared up entirely. So in those cases one must assume that the disease was one affecting the peripheral nerves, and was, indeed, a peripheral neuritis. So I believe in this disease you have a series of clinical types. The first is the type in which you have only the anterior horns affected, and in which there is no pain in the limbs; the second type is that in which you have both the anterior horns and peripheral nerves affected, from which complete recovery is not to be expected; and the third form is that in which you may get complete recovery, as only the peripheral nerves are involved. I think at an early stage of the latter two types it is difficult to say whether the disease is one limited to the nerves, or whether the anterior horns are involved as well.

We have also a series of cases of muscular diseases which ought to be referred to in de-

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scribing any form of paralysis occurring in children; I mean the ordinary myopathies, of which pseudo-hypertrophic paralysis is the most common form. In those cases, it is supposed, there is an intact condition of nerve-centres, and only the muscular fibres decay and become useless. Various types have been described. Besides the pseudo-hypertrophic form alluded to, there is also the type described by Erb, which comes on in early adolescence. But there is another form in which the muscles of the face are also involved, so that the patient cannot close his eyes or pucker up his mouth in the form necessary to enable him to whistle. Those are the three forms of myopathy which have been described. But as there have been described cases which might be put into either class at different periods of their history, and as in the same family two or even more different types have been described, I think one must look upon all forms as being only clinical varieties of the same disease.

There have been described in the last few years a few cases which seem to be, as it were, connecting links between myopathies and spinal atrophies, cases in which we have not only the muscular condition, which is peculiar to myopathy, described and figured microscopically, but in which we have also actual degeneration and decay of the anterior horns themselves. In this country Dr. John Thomson and Dr. Alexander Bruce, of Edinburgh, were the first to describe a case of this kind, and it was characterised by gradual wasting. It was in a child of two years of age, which gradually became feeble in health and died. On post-mortem examination certain changes were found which are supposed to be peculiar to myopathies, but they have been found also associated with degeneration of the anterior horn-cells. I have a case here to show you to-day, which I am inclined to think is of this variety, in which there are a set of symptoms which seem to point to the likelihood that the child is suffering from myopathy; but in which there are symptoms, such as fibrillary tremor and peculiarities in the electrical reactions, which seem to indicate that there are anterior horn changes as well.

I will now show you the cases, and I will describe them formally. I think you will see in them illustrations of the points I have mentioned to you.

The first is one of those cases of cerebral diplegia. The patient is one of five children. The first is alive and healthy; the patient is the second; the third died at the age of two with some brain trouble; the fourth likewise died at two years of age; the fifth died of bronchitis at two years of age. In this case there was nothing abnormal in the labour or in the pregnancy, but it was found that as the child grew up she took no notice of anything. There is now slight strabismus, and general rigidity affecting not only the legs but also the arms, and the mental condition is considerably impaired. One point is that since she came into hospital she has distinctly improved. If one recognises the condition in early life one can take a hopeful view of improvement in a child the subject of this affection. One can be certain that sooner or later this child will be able to walk, imperfectly, of course, and that improvement will go on, and it is very difficult to fix the limit at which improvement will stop. In this case there must be a condition in the cerebrum of an extensive lesion, involving not only the cells which subserve the legs, but also those for the arms, and probably also the eyes and the face, as well as those which subserve the mental processes. In this case, as I have said, we have no history of difficulty at the time of birth; nor have we the usual history that the child was the first in the family, nor is there anything in the mother or in the family to excite any idea of this being a case of congenital specific disease. So one must look upon it as being due to some condition, either of maldevelopment or of interference with growth in some way, occurring either at the time of birth, or occurring even before birth. It is likely, I think, that in some of these cases we have to deal with the effects of some pre-natal condition, so that we have the child starting life with an impaired cerebral condition.

The other child whom you see has both legs affected, quite paralysed, for you see there is no movement at all. The left arm is also paralysed, and only the hand can be slightly moved. That movement of the hand has come back since the child was admitted into the hospital. The history was that in August last year, when the weather was very hot, the child became seriously ill, and is said to have become unconscious. It had no convulsions, and after the acuteness of the illness had passed off it was found to be paralysed in all four

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limbs. Now you see this arm has recovered, and you often find that in this disease. This, of course, is not an example of cerebral disease. The child is intelligent; the nature of the paralysis is flaccid as compared with the extreme spasticity and rigidity of the other child. This marks it out as a different type. It is an infantile paralysis, an anterior poliomyelitis. There is no history at the commencement of the illness of pain along the nerves, or in the paralysed limbs, so we must assume it is a pure case of anterior horn change. In one of these children you have both legs and both arms involved, and in the other both legs and only one arm, although there is a history that at the time of the acute illness both legs and both arms were affected; in infantile paralysis you often find that the paralysis at the onset is much more extensive than it is afterwards. The explanation probably is that at the time at which the spinal cord is acutely inflamed there is a focus of inflammation, perhaps, in one of the anterior horns, but there may be œdema or some sympathetic condition which also affects the opposite anterior horn and for a time destroys its function. At all events, there is some condition interfering temporarily with the function of the anterior horn. So if you have a child with infantile paralysis, with all four limbs paralysed at first, you may with a certain amount of confidence look forward to *some* improvement and *some* passing away of the paralysis, perhaps altogether in one limb. It is not invariably so, but I should say that in nine tenths of the cases in which both arms and both legs are affected one, if not more than one, limb undergoes almost complete recovery.

The next patient is a man who came here some years ago on account of fits. The history in this case is that he was the first child after an interval of ten years, and that there had been some difficulty at labour, but I could not ascertain what the nature of the difficulty was. However, he is able to walk very well, although he was not able to walk until late. He walks without much difficulty, and he has very good use of his arms. Unfortunately he is subject to fits, but these are almost completely in abeyance as a result of treatment by drugs. He gets long intervals between the attacks, and I think in time they will be controlled completely. In this patient the condition of the teeth and the fact that he has iritic adhesions lends weight to the possibility that there is some congenital specific trouble at the bottom of it. But the history of the onset of the disease is such as you get when there is no specific disease present, and the indications are those of a lesion affecting the two leg centres in the brain, and causing this condition of cerebral diplegia.

The next case is that of a boy, an out-patient, and in him there is a condition of almost complete paralysis of all four limbs. He has never been able to walk. He is very spastic, but he is very wasted and very badly developed. He also has the curious movements which you see, which are not like ordinary athetosis, though they are of that kind. In this case there is no doubt that there is some disease of both sides of the cerebral hemispheres. What the nature of the disease is I cannot say. There is no history of trouble during the act of birth. The mother says she was not very well while she was carrying the child, but I do not think it is of great importance, and there is nothing in the history which would suggest that it may be a case of specific disease. Therefore it is one of those cases for which one cannot find any reason, and which seems to point to some pre-natal condition which interfered with the development of the brain of the fœtus and so produced this result.

The next patient is a young woman, an out-patient, who came last week. She has definite paralysis of the left hand. The history is that she had measles at the age of one year eight months. There is said to have been no convulsion of any kind, but she was found to be weak on the left side after the attack of measles. Apparently she was very seriously ill; and now, within the last year or two, she has been troubled with occasional fits; but there has been nothing in the nature of any severe symptom. She now has this paralysis of the arm, and a certain degree of spasticity in the leg; she has also very well-marked athetosis. This is a typical athetosis; it does not undergo the cycle of movements which one often sees, in which the hand goes up and turns round. But you see she has to hold her arm in order to prevent it getting away out of control. Although this hand seems to have a good deal of movement in it, there is no voluntary movement, and she has no control of the fingers. The flexion of the wrist, as

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is frequent in these cases, is extreme; and it is in that joint that the athetosis seems most marked. It also affects the leg, and the affection is generally one of eversion. Often there is a certain amount of movement in the face, and in this patient there is a little movement at the corners of the mouth. The platysma muscle is often affected, but here the angles of the mouth are the parts chiefly involved. This patient is subject to fainting attacks, no doubt epileptic in their nature. I think one may reasonably look forward to being able to prevent anything like serious attacks coming on, although I am afraid that, as regards her hand, we cannot hope for any very great improvement.

Next I show you a child with a similar condition of left hemiplegia with athetosis. The history is that she had diphtheria at six years of age, and she had apparently some attack of diphtheritic paralysis afterwards, and two months later she had this paralysis coming on. But the paralysis is not such as is usually directly related to diphtheria. After some cases of diphtheria you have a form of paralysis which is not the ordinary form of diphtheritic paralysis, but rather a cerebral form, which is probably embolic in nature. This is probably an ordinary case of infantile hemiplegia coming on in the usual way, with convulsions, and leaving behind it this paralysis with the curious movement. It always seems to me that in those cases the athetosis must depend upon some interference with the developing brain structures, because you rarely see it in ordinary adult cases. If you see an ordinary hemiplegia in an adult, you don't expect to see athetosis, and the cases in which it occurs characteristically are those in which it has come on in early life, as if the disease were one that interferes with growing structures.

The next patient is a boy, whom I have shown here once before, and some of you may have seen him. At the time he was first shown he was much more helpless than he is now. He walks in a very spastic way with the aid of two sticks. The history is that while he was in Middlesex Hospital, on account of typhoid fever, he had some peculiar illness, which was associated with convulsions. When he was in the hospital he had a very marked degree of loss of power in the legs. He also had a peculiar facial expression, which has not entirely disappeared. He was by no means stupid, and the question was, What was the nature of the paralysis affecting his limbs? He had very much exaggerated knee-jerks, some ankle-clonus, and also extensor plantar response, showing that there might be some disease of the pyramidal region. The condition was so peculiar, and the state when he began to improve so striking, that I thought there might be some functional ailment in the case. I am not sure now that there is not. The improvement goes on slowly but steadily, for a few months ago he was not able to walk at all without being supported on either side. Now you see he can walk readily with two sticks, and, as a matter of fact, he is able to get along without sticks; and when he does that there is a peculiar tapping of the heel on the ground, strongly suggestive of functional trouble. Therefore in this case I am not sure how much is organic and how much is functional. I show him to you as a case in which there is evidence of some interference, probably with the cortical hemispheres. There is no doubt that he has decidedly improved, and I hope he will soon be all right.

The next is a boy, an out-patient. There is a history that at the age of five he had severe convulsions affecting the left side, and after the convulsion was over he was found to be paralysed on the left side. The paralysis rapidly passed off—at all events as regards the leg,—although there is still a trace of it left in the inversion of the left foot. He is still subject to occasional attacks. Therefore in his clinical history the patient illustrates the condition of infantile hemiplegia. The peculiarity about him is his left hand. I have told you that sometimes, instead of athetosis, you get a tremor which is extremely like intentional or functional tremor of disseminated sclerosis. This boy shows it; it is exactly like the tremor of disseminated sclerosis, although there is no doubt that in his case it is associated with a slight attack of infantile hemiplegia. I have seen, I think, only two cases (and this is the second) in which the tremor was so distinct and strikingly like that of disseminated sclerosis.

This young woman's family shows no history of nervous disease. She was in India at seven years of age, and had fever there. She is said to have been healthy until eight years of age, and then her father died suddenly in her presence, and since that time her mother has noticed her present condition. She has difficulty in speaking, has

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jerking of the head when she attempts to lift anything, and she can lift heavy weights better than light ones. She has over-action of the facial muscles, especially when at rest. There is some difficulty of articulation, as the lips are kept tightly closed. On attempting voluntary movements the arms show inco-ordination, and there is an increase of spastic movements. There is no nystagmus; the knee-jerks are active and not increased. It is a case of double cerebral lesion, and therefore one may look upon the case as one of cerebral diplegia, though what the nature of the condition is it would be difficult to say. I should think there is probably some change in the cell, which came on at the time when this condition was first noticed. There was no difficulty in connection with birth in her case. However, she is improving, but now there is difficulty, more especially in connection with the face, as well as in connection with the arms. Still, there is apparently very little if any difficulty in getting about.

Those are the cases which I have to show you which illustrate various conditions. I have shown you a case of anterior poliomyelitis. I cannot show you one of the peripheral nerve condition of children, or of peripheral nerve inflammation associated with the anterior horn change. I show you now a case which I believe is one of very curious nature, and I cannot help regarding it as a case of combined myopathy and spinal disease. This boy came in on account of weakness of the limbs and diplopia. He was in the hospital once before under Dr. Jackson. It was found that he had slight weakness of the left external rectus, nystagmoid movements, and weakness of the legs, which is very like the weakness in pseudo-hypertrophic paralysis. He was a full-term child, but could not walk until he was five and a half years of age. Here we are dealing with a condition of congenital weakness to begin with. His walk is suggestive of pseudo-hypertrophic paralysis; he has no enlargement of any muscles, but he has almost complete absence of one latissimus dorsi and of the lower part of one trapezius. He has also fibrillary twitchings in all the muscles of his body. The knee-jerk is present but difficult to elicit on one side, and on the other it cannot be elicited at all. In getting up he has the same difficulty that a patient has who suffers from pseudo-hypertrophic paralysis. So that looking at the features of the case, one cannot help regarding it as probably a case in which there is a mixed condition present, a condition possibly of myopathy, and associated with that some change in the anterior horn itself. If it is, of course it is rather an unusual case, of which there have been only two or three series described. But if one case of that sort has been described, I do not see why there should not be a condition, at a more advanced age than that of most of the patients described, of mixed myopathy and anterior horn degeneration.

The conditions of cerebral palsy are very important, and it is also very necessary to distinguish all cerebral palsies from the spinal or from the peripheral palsies. In the cerebral palsies you have the diplegias, so-called, which are due to some lesion which affects both sides of the brain. This lesion may be one of traumatism occurring at the time of birth. In such a case you nearly always have a history that the child is the first in the family; it is very often a boy, and it is not uncommonly the child of an elderly primipara. And, of course, those are the cases in which one expects to have difficulties in connection with birth. Sometimes there has been a shoulder, and sometimes a breach presentation, but in most of the cases of cerebral diplegia you find a history of some actual difficulty at the time of labour, and often that instrumental delivery has been necessary. Of course the parents are not disinclined, under those conditions, to blame the doctor who used the instruments, but there is no doubt that one is perfectly justified, and often bound to point out, as Sir William Gowers pointed out some years ago, that the conditions which give rise to the paralysis are not the instruments which are used, but the conditions which render the use of instruments in the labour necessary. Besides these traumatic cases we have diplegias which depend probably upon some degenerative conditions arising at a very early time of life, the result of some obscure cause. Then we probably have another series of diplegias in which the condition is possibly the result of some pre-natal disease. In the other forms of cerebral palsy we have the ordinary infantile hemiplegia. This differs from the adult disease in the first place in that it occurs in young children in the first four or five years of life; in being nearly always associated at the onset with acute illness and

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convulsions; and in having associated with the paralysis afterwards movements of different characters, often spoken of as athetotic, because athetosis is the most common form; and differing also, because there is some grave interference with the development of the affected side. The pathology of the condition is still unknown. I think the most likely pathology is that associated with Strümpel's name, viz. that it is an inflammation of grey matter in the cortex of the brain analogous to the inflammation of the anterior horns of the spinal cord which give rise to anterior poliomyelitis, a case of which I have shown you.

We have, then, the forms of spinal paralysis in children, especially the form which is so common, the anterior poliomyelitis, due, no doubt, to some inflammation of the anterior horn-cells, an inflammation which possibly depends upon some actual chemical poison, or upon some microbic poison associated also with changes in the vessels. Apparently also we have, associated with the anterior horn change in some cases, inflammation of the peripheral nerves. In another series of cases I believe we have the peripheral nerves only affected, and these three types may undoubtedly be the result of the same poison.

We have also cases of myopathy, of which I have not been able to show you pure examples to-day; and we have combined cases, which I believe are cases in which there are combined myopathic lesions in the muscles themselves, and spinal lesions in the anterior horns.

Treatment of Umbilical Cord.—The best ligature is $\frac{1}{16}$ inch wide sterilised tape. This tape should be kept in a closed bottle filled with boric acid saturated solution. Antisepsis is of great importance in treatment of the cord, inasmuch as umbilical sepsis is a very frequent and fatal affection. The cord should be gently squeezed or milked toward the abdomen before tying the ligature, to avoid including a possible hernial protrusion of gut and its inclusion in the ligatured stump.

The tape ligature should be one foot long to enable one to make sufficient traction to cut through Wharton's jelly. Unless the ligature is tied tight enough to do this, it may get loose through shrinking of this jelly and permit hæmorrhage. Here likewise lies many a cause of infant death.—*Monthly Cyclopædia.*

WITH DR. SAVAGE AT BETHLEM ROYAL HOSPITAL.

IV.

GENTLEMEN,—The text of my remarks to-day is mania. Mania is defective higher control. The higher you get in civilisation, the higher you get socially, the more true is it that words, like nature, half reveal, and more than half conceal the soul within. People do not say what they think. The art of the lady of society is to make everybody believe that she is much impressed with him or her, when in truth she may not care a bit for any of them. The power of not showing your emotions is the characteristic of the highest conventional social development. People who are rather less educated express their feelings, thoughts, and emotions more freely. When you come to the thoroughly illiterate they say what they think to a very great extent. And when you come to the insane they say everything that comes to their minds. To compare what I have been saying with the constitution of the nervous system, the same is true. Between feeling and action in the educated person there is the process of consideration, of organising will and desire according to past experience. A thoughtful person does not at once reply; he considers, then replies or acts. The simplest complete nerve process is reflex action, of which the individual is unconscious. Then comes the instinctive reaction, which is reaction to a stimulus, and, though it is more or less automatic, it is consciously done. Then comes the last or highest stage, in which the action is deliberately performed. First comes an impression, then a time of consideration, then the period for action. The person who is suffering from mania has passed almost into the instinctive stage, so that he says what he feels. There was one foggy night, between Kennington and Guy's Hospital, when an elderly gentleman was walking along the pavement by the side of his carriage. It was too foggy to be absolutely safe riding in the carriage, and therefore he walked along the curb, while the carriage was driven by the side of him. Every person he met, seeing him, as it were, out of place, looked at him. Some merely opened

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their eyes wider, others turned round deliberately to look, certain others said, "Fancy, look at that old bloke walking by the side of his carriage." All the passers-by wondered why the "old bloke" walked by his carriage, but it was only the more lowly educated of the commoner people who expressed their feeling. That is similar, though less in degree, to the difference between the highest control which you meet in the sane, and the defective control which occurs in the maniacal person. Nearly all the symptoms which are associated with mental disorder of the maniacal type are attributable to defective control. Defective control shows itself differently in different individuals. The young man glories in his strength, and if he loses his self-control he is very likely to knock somebody down. I had to see the other day a magnificent muscular specimen; his brother-in-law objected to his doing something, and he immediately knocked him down, and considered himself justified in doing it. When he is well he would no more think of knocking his brother-in-law down than he would of misbehaving himself in other ways. On the other hand, the woman who loses her self-control becomes hysterical and emotional, and may become amorous. There is a girl whom I have to see within the next few days who is dwelling upon the unattained, perhaps in her case the unattainable,—a lover. She thinks and imagines a romance. As long as she keeps this to herself you may say she is sane, but when she is found ordering a trousseau, and wanting to get a wedding ring, then her friends consult me, and they conclude that she has lost highest control, and is expressing openly what she has been feeling long enough. There are hundreds of young men and women who would like to be married, and who have related ideas in their minds, but who do not express them; it is a natural and common line of feeling, but when the individual loses self-control he may begin to assert positively as facts things which are not true. So remember, that just as I pointed out that the essence of melancholia is disorder of the emotional side of feeling, so the cause of symptoms of so-called mania are to be attributed to the defect of highest control. If you look at it in that way you may expect to find always exactly the same class of symptoms, though they differ widely in particulars.

Where the person is losing highest control through progressive brain decay, such as is met with in general paralysis of the insane, there is very frequently mania. There may be great wildness and excitability. In the same way the highest control may be removed temporarily by alcoholism, and in this you may have exactly the same type of symptoms as those met with in progressive decay; a person who is partially drunk is partially mad, as far as symptoms are concerned. And you therefore have to remember that, whether due to progressive disease of the brain, such as general paralysis, or to temporary interference with the fullest nutrition of the brain, mania may result; the physical basis of mania may be either disease of the brain, or merely malnutrition of that organ. Also I would point out that mania may be a defective control due to habit. I see every now and then individuals who have been wilful all their lives, and with whom there comes a time when they cannot control their wilfulness, and who do foolish, wicked, and absurd things, and yet are perfectly conscious of them. Such cases inhabit the borderland between hysteria and mania. Mania is rather arbitrarily divided into two great groups; one group is allied to hysteria, another to delirium; and you will find that there are some maniacal patients in whom there is almost entirely a delirious state, and there are other cases, such as you will see presently here, in whom the emotional disorder and the uncontrolled expression of feeling and thought deserve the term hysterical. It is some satisfaction to the friends of girls who are maniacal to be told that they are suffering from hysterical mania. The name does no harm, and there is a good deal of truth in it, because you see hysterical conditions passing into maniacal conditions, and you see hysterical conditions which never proceed to maniacal conditions, which are mere perversions or disorders of control and nothing more. I am in the habit of saying that just as you have hypochondriasis apart from hypochondriacal melancholia, associated with or allied to melancholia, so you have hysteria allied to mania. But remember these two groups. In the one the symptoms are more transient; I sometimes say they are like medical rainbows, you see their colours and they disappear. Such patients either recover rapidly or die. The acute delirious cases are very grave, and they are cases which can scarcely be demonstrated in an

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asylum. You may happen to see one, but as a rule they are so bad, so severely ill, that one cannot in all humanity demonstrate them; it would be damaging their chances of recovery if one did. Remember, then, that anything which will produce temporary nervous or mental disorder may produce a more permanent disorder of the same kind. Take a very common example. I was consulted only to-day about a gentleman who goes to one of the large London hotels, and being an habitual drunkard he takes more than is usual, even for him. As a consequence he gets delirium tremens, and passes into a condition of chronic maniacal excitement, more near mania than delirium tremens and more lasting. Anything which will produce delirium may produce delirious mania. I have seen it in a girl of very neurotic stock follow the accidental taking of belladonna liniment; the delirium passed into a condition of mania. Take another example:—a patient having scarlet fever has delirium, and the delirium passes into a condition of acute delirious mania. Anything, in fact, which will produce delirium may produce a continued delirium, otherwise delirious mania, a condition which has been called brain fever, and one that is of grave import; it is a disease which kills in a very large number of the cases. Besides such severe cases there are the more simple cases of hysterical mania. Such are more emotional, and we must now consider their bodily and mental states. The bodily state of such a patient is usually not a strong one. Mania is not a sign of strength. I am constantly quoting that text—whether rightly or wrongly—"in quietness possess we ourselves" or "our souls." It is the restless person who is weak. When persons get weak, instead of being quiet and bringing themselves to contemplate things, they are busying and bustling about. You would not say that a person suffering from chorea was a strong person. But he is strong who can hold a poker at arm's length for a long time. The person who is strong has control, and is able to direct the force in the way he wants. The circulation is not good as a rule in these cases. Sleep is variable. Sometimes it is very good. Very often these people are like the lower animals; they constantly move about till they are tired, and then they sleep; after the rest they may become again excited and destructive, until they again tire themselves out, and go to sleep once more. Their appetites are capricious. In the early stages very often they do not care for their food, but they do not refuse it as a melancholic person would do. They will often eat things which are filthy or abominable. Very often the bowels are irregular, and menstruation is irregular, often being excessive. Patients suffering from acute mania generally lose weight and strength, and although they may eat a good deal they are not strong. They disregard all conventions; they are untidy about dress, and about their hair. A woman more particularly is to be judged by her hair and her boots. You do not see the person who is suffering from mania careful about her hair or her boots. She is also lost to the delicacies of society; she will lift up her dress entirely without there being necessarily any indelicate or erotic feeling. In the same way, when food is put before her, instead of using a knife and fork and spoon, she puts her hands into the plate and helps herself in a barbarous way.

One of the great troubles in many of these cases is not only their disregard of active cleanliness, but of passive cleanliness. They will not wash themselves, and they will urinate or defæcate anywhere. I yesterday saw a lady of great refinement who is in an early stage of maniacal excitement, and one of the first things the nurse told me was that she urinates everywhere. She was got up and walked about to induce her to make use of the commode; but she said she was tired, and would like to go and lie on her bed; she no sooner got to bed than she micturated. The nurse said, "That is very wrong;" she replied, "Yes, it is very wrong," but she repeated the act next time. Therefore there is a defect of will-power, a defect of control and design. I am in the habit of saying that maniacal patients get the credit for being destructive, but in all the basis of their destructiveness is a constructive one. It is like so many social and anarchical people who aspire to destroy the civilisation which we have attained with the vague idea of a grand new one in their mind; but it never gets beyond the destructive stage. So you see in many of these people who are reputed to be sane, the basis of whose ideas is that they want to make something new, there is no persistence of will. The thoughts of maniacal patients do not continue, but go from one thing to another. Each impression is probably followed by some reflex

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action; an idea comes to their minds, and there is an association of ideas in the consequent act, but it is not the usual or considered one. You show such a patient a ring, and she looks at it and says, "ring, bring, sing, ding, swing—parrot's swing." She stops until something else is said. You see when she comes to the word "swing," and is hard up for another word to rhyme with it, there comes to her mind the impression of a bird swinging, an ideational, not verbal association. So what appears to be incoherent is really rapid combined or confused reaction. That gives a perfect example of the way maniacal people bring out the succession of ideas. These are associations of incoherence as we call them, but many of them are evidences of coherence which exists in the mind. I want you to look at them from the broad point of view. You have not to treat mania, but maniacal persons. Some of these maniacal persons are physically weak, and you must not neglect the physical ailments in maniacal persons. One lady I saw to-day was suffering from metrorrhagia, and, of course, I got a gynæcologist to see what was wrong before doing anything else.

You will have noticed that in these cases of defective control there is a tendency to a reversion to barbaric times; people suffering from maniacal excitement are fond of taking their clothes off. A certain number of them do it from erotic feeling and desire, but one or two have told me afterwards that if I only knew the burdensomeness of having anything on I should understand their acts. I can understand the feeling of freedom in a patient doing exactly what she likes, without anything unpleasant, without any more obscene desire or idea than that implied in "wild in the woods the noble savage ran." This patient can answer quickly, and thus she compares with the melancholic cases we saw before. Nearly all persons suffering from a disorder of this maniacal type answer questions when tested. They will not always be coherent or correct in their replies, but they will answer. Besides the desire to be without their clothes, you find such patients show a love, as I said, for savage decoration. Now if I were examining for honours, I should give a very good mark for a man who, when examining patients for unsoundness of mind, noticed that the patient had a string ring round her finger, or a piece of coloured tape round her arm. These may be things which would not appeal to you at first, but they mean a great deal. There is the vague idea that the ring denotes that she believes she is going to be married, and as a consequence she decorates herself in that sort of way. As a rule in these patients sleep and nourishment are both fair. The memory in a large proportion of these cases is perfect; that is to say, these patients remember things said to or before them. For instance, a patient like this, after she gets well may remember being brought in here to see a lot of men sitting round. She may say, "I do not know what they were there for; it might have been some show." Another may say, "They had to take me before the House of Commons, or before a jury." But the incident is remembered, and therefore you should be careful what you say before such patients. I am always telling students that I have had reason, in past years, to remember saying things which I regretted in the presence of patients. I remember calling a somewhat distinguished lawyer a "dirty beast." I thought I was justified in saying it, because when I spoke to him he had got something in his mouth which was very objectionable. He got well, and I said to him afterwards, "what do you remember?" He said, "I remember you calling me a beast." Remember that people in this state have defective control, but they may see well, they may hear well, and they may taste and smell as ordinary people do, and they may also remember. They often have defect of will and power of direction. In many cases it means they are reflex-acting machines. I saw a man this morning who had been formerly in Bethlem Hospital. He was describing the earlier stages of his illness, and he wanted to know whether I should advise him to return to asylum treatment. I said, "You seem to be all right." He said, "I am, but I am just beginning to feel I am losing my grip of things; I am irritable with my wife and children. If anything goes the least bit contrary I stamp instead of talking over matters quietly. If the least thing upsets me I am angry, and if I stuck at home I should knock somebody down." I said, "I fully enter into your feelings." As one walks along by the hedgerows and knocks off the bramble trailers, there is a certain pleasure experienced in exercising power.

This young lady is twenty-seven, of no occupation. The supposed cause is fasting during Lent. The symptoms described before admission were

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violence of manner and incoherence of speech, and inability to answer questions in any rational manner. The nurse states she is noisy, and has become more so during the last two days. She does not sleep. She is incoherent in speech, and is wild in gestures and language. She has been very excited, and is incapable of rational conversation. There is no neurotic inheritance. This is her first attack. The attack was preceded, as in so many of these maniacal cases, by a period of depression. I have told you that nearly all cases of mania are preceded by sleeplessness, self-consciousness, and indigestion. The whole mind, and body, and digestive power, and nutrition fail. Then there comes defect of highest control or mania. Three weeks before admission the patient fancied she was profoundly ill. She has had hallucinations of sight.

I shall have to speak presently of hallucinations of the senses and their relationship to mental disorder. The sense that is most specialised and most definite is the one that is most likely to be perverted. The power of hearing is exercised in the dark as in the light, and therefore is more constantly used than sight. Therefore hallucinations of hearing are more common than those of sight. Hallucinations of sight, however, are very common in youthful cases. One hardly knows why, but in certain conditions of special nerve instability you get a greater tendency to hallucinations of sight than you do of hearing. I will not propound any theory. Hallucinations of sight and hearing are most common in conditions of blood poisoning, alcoholism, and the like. In delirium tremens and such states you get hallucinations of sight more constantly and markedly than you do hallucinations of hearing. In adolescent cases you get hallucinations of sight more commonly than of hearing In maniacal conditions with defective highest control you get hallucinations of sight more commonly than you do hallucinations of hearing. In senility, again, with slow breaking down of nervous tissue, hallucinations of sight are very common indeed. I saw an old lady recently who fully recognised that the sights were false, but at the same time said she saw and worried over them. Just as she was going to sleep there would be a procession of faces passing from one room to another.

The treatment of mania by non-restraint is the best treatment; therefore in the majority of cases you cannot treat maniacal cases satisfactorily at home. I wrote to the friends of a patient only yesterday saying, "The home where your relation is is admirable as a nursing home, but is not the place for a person suffering from mania." The treatment of maniacal people is not being kept in bed. I have told you that in melancholia a very large proportion of cases are greatly benefited by being kept in bed. On the other hand, maniacal cases should be treated scripturally. They should be turned, as Nebuchadnezzar was turned, wild into the open, and they will perhaps then get well. So I should say it is essential that people suffering from ordinary maniacal excitement not dependent upon any physical disorder should be allowed as much liberty as you can give them. Therefore it is well that they should have strong clothes which they cannot take off, because it gives them a greater amount of liberty. There are asylums where they are very proud of saying that no patients are ever put into a padded room, and that no patients have strong clothes put on them to prevent them doing what they like. But they have manual control; they have an attendant to sit on each side of them holding them down. That, of course, is much more irritating to the patient. I should prefer to be in a padded room, where I think I should get more quickly well than if I were held by two or three attendants. On one occasion I had to see a lady with eight nurses dancing attendance on her. She said it was very great fun to keep them all employed. They were very much astonished when I asked the patient to take my arm and walk in the garden. They wanted to follow us on our trip, but I said it was not necessary; nor was it; that patient got well when less worried by many nurses.

In this, our next patient, we have a perfect example of incoherence. This lady, I regret to say, has suffered in this way for some years, and she is not very likely to get much better. She has loss of the highest self-control. What she thinks of she acts upon immediately; what comes into her mind she says. I often say if I wanted to impose a speech test of a shorthand writer's capacity, I should set him to take down the words of such a patient as this. I think it is better she should talk to you than that I should.

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You will notice she will begin talking about one subject, but the slightest external sensory impression turns her into another direction.

My favourite example of this kind of incoherence, the truly Shakespearian type, is that of a girl who, years ago, was in Bethlem Hospital. She told me herself that the chief recollection she had of her maniacal attack was the want of any necessity to guard either her language or actions, in fact she felt free. She chaffingly said to me, "I think you will like it yourself; there is an utter lack of obeying rules and conventions of society which is very delightful; one could say what one liked and no one minded." She was Shakespearian in her rhyming and in her associations. She went into one of the airing courts, took up a buttercup, and then she put the buttercup under the chin of another patient and said, "Yes, you like butter, buttercup, gold cup, king cup, butter, flattery; I can take a lot of it." It is as near like Shakespeare in Ophelia as you can have it. We may trace her thoughts thus: you all know the old child's game, to see whether the person likes butter by putting a buttercup beneath the chin. From buttercup the patient would hark back again to butter, and then flattery, and say that she could take a lot of it.

This patient does not care what is going on around her; she is perfectly happy, but I regret to say that, although she is only about the same age as our last patient, she is practically incurable. Heredity is supposed to be one cause in her case. A maternal uncle was confined in an asylum, and also an aunt and a cousin, and two of the children of the family have had hydrocephalus. She is said to have had a convulsive fit while teething. She had influenza a year before admission. Love disappointment is supposed to be the exciting cause. In the largest proportion of cases it is disappointment that there is no love affair. When you get some further trouble, for instance disappointment associated with seduction, or breach of promise, the shock may be enough to turn the balance. A thing which is very striking in these cases is that the severer shocks are not associated with cause of mental disorder. In puerperal cases it is the ordinary deliveries which are more commonly followed by maniacal excitement than instrumental labours, and so severe grief and shock, although they may be associated, and are sometimes with mental disorder, yet in a very large proportion of cases it is not a great shock which upsets them. In stupor and acute dementia there may be shock, whether it be shock of illness, injury, or the shock of severe domestic or pecuniary loss. It does not mean that a person who is depressed has only depressed or melancholic forms of mental disorder. You have to remember that mania may come on readily after moral shock. A favourite example of mine is that of the lady who was married after waiting many years for her lover, who arrived from abroad a broken-down man. They were married, and she awoke to find her husband dead by her side next morning. It was a terrific shock to her, but instead of being melancholic she was admitted into Bethlem in a condition of acute hysterical mania.

Before the patient before you became ill, there was a period of depression, so that she allowed herself to be led about peacefully, but refused to answer questions or utter any sound. The expression was one of apathy. The face wore the real melancholic expression. The report says she found fault with her food and was untidy in her habits, and required feeding as if she were an infant. She seemed morose, obstinate, and could not be got to answer questions. When admitted into Bethlem Hospital she was suffering from profound melancholia with stupor. That has gradually passed off, and now she is suffering from chronic mania. I am afraid the prospect of her ever improving is very slight. One scarcely knows what to do with such cases except to keep them out of mischief. In the majority, any extension of liberty would be associated with the most grave moral danger. A patient of that kind would be subject to any designing person, and it is therefore absolutely necessary for such a patient to be kept under control. She is happy enough here. There is no continued desire of any sort, and she is eating and drinking enough. She is untidy, unconventional, incoherent. She is probably sleeping well; her circulation is fair, and she menstruates normally. It is very important in all mental disorders, to notice whether there is improvement in physical health without any improvement in the mind. If you get the machinery restored perfectly and yet it will not keep time, you have reason to give the very worst prognosis.

Now the next patient I show you is one who is

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excited. She has marked defective control. There is first of all untidiness, as you will notice. The next point is that her clothes have to be fixed on in such a way that she cannot get them off. Her boots, as you will see, are not conventional. Her circulation is fair but not good. The reaction to questions is good enough. She understands what is said to her, and responds rightly. Giggling is undoubtedly a sign of weakness, and here we have it in an extreme degree. Does not it strike you how like this is to the early stage of intemperance? She is in very much the same condition. To quote Wilks, you have only to watch people at a public dinner, when joy, and excitement, and stimulants together reduce the level steadily, and then you see your friend pass through these stages—volubility, emotional defect, pugnaciousness, stupidness. These are all symptoms of defective highest control. This patient takes me for the Duke of Norfolk. It is always rather hard to explain why women so often mistake identity; such a mistake is more common among women than among men. Women mistake people about them for their husbands, brothers, and friends, or their heroes. Another characteristic about nearly all these cases is their isolation—their separateness. People suffering from acute mental disorder are asocial; they do not desire companionship; there is no developing of the social qualities. Persons suffering from mental disease are perfectly content alone; they do not want to talk or work with other people, they are quite content to do nothing. Our patient's age is twenty-nine; she was violent before she was admitted. She is married, and hers is a case following childbirth. The common form of mind disorder following childbirth is puerperal mania. You may also have puerperal melancholia or puerperal dementia. In this case the child died, and about four or five days after childbirth our patient thought the child was still alive. Then she thought she had another child, the first being a girl, and she thought the second was a boy. She had delusions about her own family. In delivery chloroform and forceps were employed. I have told you already that it is a common thing for people to break down after childbirth without any special exciting cause. The majority of cases of puerperal insanity come on after ordinary natural full-term labours. A point that has been referred to by me, and by others, is that chloroform may have some effect in this direction. I have seen a certain number of cases in women who broke down in the confinement when they had chloroform administered, whereas when they have had other children, and were delivered without chloroform, they did not break down. I do not know how to explain it, but I think it is more than a coincidence, because it has been described by other observers. The delusions which this patient had were, first, as to identity. She mistook people and made mistakes; she also thought she was being poisoned. It is interesting to notice that ideas of poisoning are not infrequently associated with some trouble of this kind. In puerperal insanity, as well as with local disorders of the reproductive functions, you very often meet with ideas of poisoning, and there may be hallucinations of taste and smell. This lady had ideas she was in the company of bishops. She believed herself to be at church, whereas she was in her own room. The majority of cases of puerperal insanity, if acute, get well: 65 per cent. get well, 20 to 30 per cent. remain incurable, and 5 or 6 per cent. die. The great thing to be done is to see that such patients are well fed, well looked after, and not drugged into quietness. Drugging them into quietness is one of the most harmful things. Unfortunately a large proportion of puerperal cases are treated at home. Naturally the husband and relations do not like to send a case following on childbirth to the asylum, but many of these cases are not properly treated at home, though I allow that a large number are. A great many are drugged into quietness, which means that peace is established, but unfortunately it is the patient's mental destruction. It is of importance that patients suffering from puerperal insanity should be well fed and kept out of mischief, that they should be retained in an asylum until the catamenia have returned. My general rule is to retain under medical observation, not necessarily in an asylum a patient who has suffered from puerperal insanity for at least two periods after she has apparently recovered. There is one important thing to remember in relationship to puerperal cases also, and that is, very few of them relapse without some fresh similar cause. When they are once fairly on the road to recovery, they go on till they get well So that from the practical point of view, as soon as the patient is really beginning to improve after

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puerperal insanity I send them away for change from an asylum, but very naturally I do not send them home at once. It is just as well to warn the husband that no immediate pregnancy must follow, or else there will be a very greatly increased danger.

A THURSDAY CONSULTATION AT ST. BARTHOLOMEW'S HOSPITAL.

MR. WALSHAM.—Here is a man, aged about sixty, with epithelioma of the tongue. Twelve months ago he noticed a small ulcer on the right side of the tongue, due, he says, to the rubbing of the tongue on his teeth. Two teeth were extracted seven or eight weeks ago. There is a large ulcer on the right side of the tongue, the edges of which are slightly everted, and the induration extends across the middle line, far back. There is a large gland to be felt in the neck. I do not think there will be any difference of opinion as to the nature of it, both from the local characters of the ulcer and the mass which extends towards the middle line as far back as one can feel. I think it is a most unfavourable case. My experience is that in such cases one removes the tongue and the enlarged glands in the neck, but almost before the patient is out of the hospital other glands in the neck become enlarged, and the disease rapidly terminates with a fatal result. My own feeling is that it is not worth while doing any operation in this case, but I am willing to reconsider the matter if Mr. Lockwood thinks differently.

Mr. LOCKWOOD.—There can be no doubt as to the diagnosis; the mass is epithelioma of the tongue. Mr. Walsham has not said so, but by removing the whole tongue the ulcer and growth will be taken away. The glands in the neck are the chief difficulty. I think if you attempt any operation at all you will have to include the glands too. On the whole I think I would be inclined to try removal. One point about the glands is that they are not involved very high up; I cannot feel any near his mastoid process or high up underneath the angle of the jaw. They are rather low down, and therefore I think they might be removed without any great difficulty, especially as they are still freely movable. I agree with all Mr. Walsham has said as to the forbidding character of these cases, but I think the man would be better off by an operation than if one were not attempted. If nothing is done the future must be very unpleasant for him with a huge growth in his mouth, with blood issuing from it, and with sepsis and fœtor of his breath. I should advise him to have it done.

Mr. WALSHAM.—My point is with regard to the rapid recurrence. There is always considerable danger in taking out the whole tongue, and then there is the extra operation of removing the glands of the neck. Is it worth the risk seeing the great probability there is of an early recurrence? I will obtain one or two other views.

Mr. LOCKWOOD.—Yes, it is true that in many of these cases the disease recurs, but every now and then, as I think Mr. Walsham will admit, a case surprises us, and the growth does not recur for a considerable time. This encourages us to treat these unsatisfactory cases, because some of them turn out happily.

Mr. WALSHAM.—This woman, aged forty-five, comes with a mass in her left breast. There can be no question about the nature of it, I think. You see that her arm is œdematous and useless. There is a huge mass in the subclavian triangle, making it look even at a distance very different from the opposite side. In the axilla there is also a mass of large glands. Before saying I would not do anything I thought I would ask some of the other surgeons to see her. I do not anticipate any different views as to the nature of the swelling. I regard it as undoubtedly a case of scirrhous carcinoma, with secondary infiltration of the glands, and not only of the glands in the axilla, but of the glands above the clavicle, and pressing of the axillary and subclavian veins, and producing that œdema of the arm.

But I brought her in for another purpose. Some of you know that in these incurable cases removal of the ovaries and the administration of thyroid extract have done a great deal of good. I have never felt very favourably about this method of treatment, and I am not very much of a believer in it now, but when talking with Mr. Henry Morris at the College of Surgeons the other day he told me he had marvellous results from it, even in cases

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which looked perfectly hopeless. I want to see whether I can get any opinions which will encourage me to do that operation. If she is abandoned she cannot survive many months. I do not think anything can be done locally, and unless I were strongly pressed by my colleagues I should not attempt it.

Mr. LOCKWOOD.—One reason for doing a local operation would be the removal of the whole of the disease. That is quite out of the question here. Again, if the condition were exceedingly painful there might be a reason for attempting to remove it. But this patient says she suffers no pain in it except that her arm feels heavy and aches. The last reason one would have for operating would be to rid the patient of a large malignant ulcer. She has not got such, the carcinoma seeming to be of a cicatrising character.

With regard to the next question which is raised by Mr. Walsham, namely, the justifiability of performing any operation for removal of the ovaries and the administration of thyroid extract, I have followed this subject, as most of you have, with a reasonable amount of attention, and I have been very much struck with the cases published by Mr. Stanley Boyd. I have come to the conclusion that it is a justifiable procedure. I have really gone further. I was asked the other day whether I would perform that operation for a patient who was to come here. I said I was quite willing to undertake it. If you feel disposed to give this woman a chance of alleviation by that means I think it is proper it should be done. I would do it myself in this case.

[The ovaries were removed at Mr. Walsham's next operating day. The patient had no bad symptom of any kind after the operation, and is now taking increasing doses of thyroid extract. The pain and swelling of the arm is certainly less, and perhaps the growth in the breast and mass in the axilla and above the clavicle are slightly smaller, but it is too early at present to form any reliable opinion as to whether the patient has received any benefit from the operation.]

The Employment of Arsenic in Chorea.—Almost every medical man is fully aware of the fact that no drug approaches arsenic as a curative agent in the treatment of chorea, and many others appreciate the fact that to produce the best result this drug must be given up to the point of intolerance; and again, that if it is so administered, it now and then produces mild toxic manifestations, chiefly in the form of slight œdema of the face, gastro-intestinal disturbances, or even a peripheral arsenical neuritis. To the latter effect we have called attention within the last year, and within the last few weeks we have seen an interesting description of a patented medicine, largely employed in England, which was found to contain enormous doses of arsenic, and which had an extraordinary reputation as a curative agent in the disease of which we are speaking; indeed, a large dose of this preparation is said to have contained twenty or thirty times as much arsenic as is commonly employed by the regular practitioner as a beginning dose. Attention has still further been called to this interesting subject by an article contributed by Professor M. Allen Starr, of New York, to the 'Festschrift' in honour of Dr. Jacobi on his seventieth birthday. Dr. Starr points out, as a result of analysing four hundred cases of chorea which have been met with in the Vanderbilt Clinic, that arsenic appears to still be the remedy of greatest value, and that it is a rule to increase the doses of the drug up to the point of physiological effect, and then to reduce them slowly, keeping the child just upon the verge of intoxication by the arsenic. The susceptibility of children to arsenic is very different in different individuals. In two cases severe general neuritis appeared during the course of treatment, although these two children were not at the time taking as much of the drug as was administered without ill effects to many others. Both cases recovered. Antipyrin appears to be the remedy next in value to arsenic, but exalgin, phenacetine, bromide, chloral, and paraldehyde have been tried with very little effect. Dr. Starr says it appears to him that less dependence is to be placed upon any drug-treatment of the disease than upon an immediate change of air and surroundings. He has seen many very bad cases recover almost entirely within two weeks after being sent to the sea-shore or to one of the country homes of the children's hospitals of this city, when they had resisted treatment for months by all forms of drugs.

Therap. Gaz. (*Editorial*).

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* *Specially reported for the Clinical Journal. Revised by the Author.*

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STRICTURE OF THE URETHRA: ITS OPERATIVE TREATMENT AND GENERAL MANAGEMENT.

By P. J. FREYER, M.D., M.Ch.,
Surgeon to St. Peter's Hospital.

(Lectures delivered at the Medical Graduates' College, November, 1900.)

PART I.

GENTLEMEN,—I propose directing your attention to-day to stricture of the urethra. It is, perhaps, the most important of the surgical disorders of the genito-urinary organs. It is the most common of those diseases that you are called on to deal with in practice, since at one or other period of life the vast majority of the male population suffers from that condition which most frequently gives rise to it. If neglected or improperly treated it is the most far-reaching in its injurious consequences, through the morbid pathological changes thereby induced.

A detailed description of the anatomy of the urethra would be foreign to the scope of these lectures; but there are certain features in its conformation to which I wish briefly to draw your attention.

The urethra in the adult male is about eight inches in length. It is commonly divided into three parts—penile, membranous, and prostatic. These two latter, again, constitute the deep, or fixed urethra, in contradistinction to the penile or pendulous urethra. This latter is six inches long, the membranous portion being three quarters of an inch and the prostatic one and a quarter inch. Ultzmann divides the urethra into "anterior" and "posterior," the triangular ligament being the boundary between them.

It must be remembered that the lengthy urethra in the male, though it acts as a urinary organ, is not essential for this purpose,—a tube an inch long sufficing for this function in the female. It is, however, necessary for the procreative function—a spermatic conduit—and is, therefore, essentially a sexual organ.

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The urethra may be described as a more or less elastic tube or hose, the inner surfaces of which, in the inactive state, are in contact with each other, being drawn closely together by the muscular and elastic elements in its walls. The surfaces are separated and a true canal temporarily formed during the passage of urine or the emission of semen; and, on the cessation of these functions, the walls close in, the cavity of the urethra being obliterated.

This contractile action of the walls of the canal may readily be demonstrated by the urethroscope. As the metal tube is pushed on the urethral walls are seen to open out, and, on its withdrawal, to contract immediately behind the instrument, the picture presented to the eye being that of a central pit with tiny folds of mucous membrane radiating from it in umbiliferous fashion all round. In the membranous and prostatic portions of the urethra, in addition to the involuntary contraction of the canal, there are certain muscles under voluntary control by which the urethra is still further closed, and by which the last few drops of urine are expelled.

Stricture of the urethra, as its name implies, consists in an abnormal diminution of the calibre of the canal at some particular part; or, as in the quiescent state the urethral walls are in contact and the canal obliterated, perhaps it may be more logically defined as a condition by which the urethra is prevented from dilating to its natural capacity by the force of the urinary stream.

The older writers were in the habit of dividing strictures into three kinds:—(1) *inflammatory*; (2) *spasmodic*; and (3) *organic*.

The former two being of a temporary character, there is a tendency amongst some modern writers, particularly in England, to restrict the term "stricture" to the third variety, which is of a permanent character. I consider the old classification a convenient one. Any condition of the urethra that causes even temporary retention or obstruction to the flow of urine, should not be lightly regarded.

Inflammatory stricture consists in a temporary narrowing of the urethral passage from inflammatory swelling of its walls, partially or wholly obstructing the flow of urine for the time being. It may be due to one of the following causes:—(1) acute specific urethritis; (2) injury to the urethra caused by faulty passage of instruments; (3) swelling of the prostate, due to congestion or inflammation of this gland; and (4) it occurs in connection with organic stricture, on which from various causes it is often superimposed.

Spasmodic stricture is the term applied to temporary contraction of the urethra, due to spasm of the muscular elements in and around its walls. It may manifest its presence in either of two ways, viz., by causing complete retention or diminution of the stream of urine; and by obstructing the passage of instruments into the bladder.

Retention from this cause may occur under the following circumstances:—(1) after stretching the sphincter ani preliminary to operations in or about the rectum; (2) following vasectomy or castration; (3) after operations on the kidneys; (4) in connection with catheterisation; (5) from injuries to the perineum, the urethra being uninjured; and (6) in patients suffering from organic stricture after exposure to cold and wet, or venereal excesses. Spasmodic contraction, as detected by the passage of an instrument, invariably occurs in the deep urethra, and is, as a rule, due to reflex irritation of the muscles induced by the presence of an organic stricture of large calibre in the anterior portion of the canal, generally close to the meatus. It is not uncommonly mistaken for organic stricture by the inexperienced surgeon, who fails to discover the real cause, viz., the stricture of wide calibre in the anterior part of the urethra. Reflex spasm impeding the introduction of instruments may also occur when stone or tumour of the bladder is present.

The inflammatory and spasmodic forms of stricture may co-exist, in which case it will be impossible to determine the amount of contraction due to each; and one or both may be superimposed on the organic variety.

The immediate treatment of retention of urine arising from either of these causes is practically the same. It consists in clearing out the lower bowel at once by an enema, placing the patient in a hot bath, and giving opium by the mouth, or morphia hypodermically. Should these measures not suffice, a soft olivary catheter of medium size, 8 or 9 of the English scale, should be passed slowly and gently, or a silver catheter if necessary. If there be any difficulty in introducing the

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catheter the patient should be anæsthetised, when the spasmodic element will entirely disappear and the instrument, as a rule, pass readily.

Organic stricture may be defined as a permanent diminution in the calibre of the urethra, due to the development of organised lymph or scar tissue in its walls.

The most common cause of this condition is gonorrhœa, and particularly repeated attacks of this disease, followed by persistent and long-continued gleets. In the inflammatory stage plastic lymph is deposited in the mucous and submucous tissues, and may invade the corpus spongiosum. If this lymph is not absorbed, as it generally is, it organises and has a tendency to slowly contract, forming indurated masses which narrow and distort the passage, and fibrous bands which partially or completely encircle the canal. This fibrous band almost invariably encircles the urethra in its entire circumference. As a rule it projects equally from all aspects of the canal, but is sometimes thinner in one direction than another. The mucous surface may remain entire, but the friction caused by the urinary stream keeps up irritation and may cause excoriation and ulceration at the seat of stricture, with fresh deposits of plastic lymph.

Injuries of the perineum, such as a kick, blow, or fall astride a fence or railing are followed by the most intractable form of stricture—the *traumatic*. This cause operates most frequently in the bulbo-membranous junction, the urethra being bruised between the impinging body and the pubic arch.

Other causes of stricture are: cicatrices resulting from chancre at the meatus, or in the first half inch or so of the tube; tuberculous ulcer; urethral abscess; injuries resulting from unskilful catheterisation: laceration of the urethra by a calculus in its exit; rupture of a chordee; and the use of strong urethral injections.

The urethra may also be strictured congenitally. This is rare, but I have met with a few instances. I do not refer to congenital narrowing of the meatus, which is not uncommon, but which causes no inconvenience and assumes no pathological importance unless the patient contract gonorrhœa, or exploration of the urethra or bladder be expedient, when it may be necessary to enlarge the orifice by an incision on its floor.

Stricture is most commonly met with between the ages of twenty-five and forty-five. This is, of course, due to the fact that gonorrhœa, its chief cause, occurs most frequently during the early years after puberty is reached, and that, as a rule, at least three or four years elapse before the stricture makes itself felt to such an extent that recourse to the surgeon is found necessary. It may, however, occur at any age as a result of one or other of the causes already indicated. I have seen stricture in children caused by injury of the perineum, and laceration of the urethra due to passage of stone.

There are certain technical terms, which have the sanction of time and general usage, applied to strictures, according to their physical conformation or clinical features. Thus "linear" or "bridle" stricture is the term employed when thin membranous septa or narrow bands extend across the canal and partially occlude it. "Annular" stricture consists of a narrow band of tissue completely encircling the canal, the contraction being such as would be produced by tying a string round the urethra. "Ribbon" stricture resembles the latter except that it is broader. The "tortuous" variety involves a considerable extent of the urethra which is irregularly contracted, being narrower at certain points than at others, with the result that the passage through this part of the canal is distorted.

Then, clinically, we have the following varieties:—"simple," where the stricture is readily dilatable by instruments; "resilient," having a tendency to rapidly re-contract; "irritable," when painful and liable to bleed on instrumentation; "indurated," when the scar tissue is very hard; and "impassable," when the surgeon fails to pass an instrument through the opening.

The older English surgical writers, from Sir Everard Home to Sir Henry Thompson, held that stricture was most commonly located at the junction of the bulbous and membranous portions of the urethra. This tenet has in recent years been called in question, particularly by the American surgeons, headed by Otis. The latter considers that he has demonstrated by the urethrameter that stricture is much more common in the penile than in the deep urethra.

This diversity of opinion appears to me to be due to the different standards adopted as to what constitutes stricture, the American surgeons re-

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garding as stricture any contraction of the canal, no matter how slight—even congenital narrowing of the meatus—provided it gives rise to pathological disturbances from the obstruction and friction caused thereby to the urinary flow. Judged by this standard it is possible that the anterior portion of the canal may be most frequently affected. But after an experience of many thousands of cases I have no hesitation in saying that pronounced organic stricture requiring instrumental or operative interference is overwhelmingly most common at the bulbo-membranous junction, an experience entirely borne out by an examination of the pathological specimens in the museums.

The proneness to the occurrence of stricture at this situation is attributed to the facility with which discharges lodge in the dilated bulbous portion of the urethra, thus keeping up chronic urethritis with consequent inflammatory thickening or ulceration of the mucous membrane long after gonorrhœa has run its course in the penile portion.

The only kind of stricture known to occur in the prostatic portion of the urethra is the *traumatic*.

Stricture may be single or multiple. The latter is most common. It will be found, as a rule, that a tight stricture in the deep urethra is accompanied by one or more contractions of large calibre in the penile portion of the canal.

Symptoms of Stricture.

We now come to the symptoms of organic stricture, which are as follows:

1. There is diminution in the size of the stream. This has been coming on gradually for some time, possibly for years, till eventually the stream has become, perhaps, extremely small, or only a few drops of urine may be passed at a time.

2. As a consequence the patient notices that he spends more time over the act of micturition than he formerly did.

3. The stream is probably forked, flattened, or twisted like a cork-screw. This, however, is a symptom to which too much importance must not be attached, as it may occur in persons free from stricture, owing to some peculiar conformation of the meatus, either congenital or acquired, from thickening of its lips from chronic inflammation.

4. Micturition may be accompanied by a good deal of straining to impel the urine through the narrowed passage, and particularly to get rid of the last few drops.

5. There may be dribbling of urine at the end of micturition, when the penis is allowed to hang down, so that the trousers get wet. This may be due either to atony of the bladder, in cases of long standing, with inability to completely empty the viscus, or to inefficient contraction of the *accelorator urinæ* and *compressor urethræ* muscles, one of the functions of which is to expel the final drops of urine from the deep portion of the canal.

6. Increased frequency of micturition is one of the earliest symptoms. This may be due to reflex irritation of the neck of the bladder caused by the stricture, or to local cystitis caused by decomposition of urine that remains in the urethra behind the stricture.

7. There is frequently pain, usually of a scalding or burning character, *during* the act of micturition, felt as a rule at the seat of the stricture, contrasting with pain felt *after* the act when stone in the bladder exists, and *before* the act when due to prostatic enlargement. When cystitis co-exists there will be dull, aching pain above the pubes, particularly when the bladder gets at all distended with urine.

8. Gleety discharge is a common accompaniment of stricture, and may be the first symptom that arouses the suspicion of the surgeon as to its existence. In all cases of long-standing gleet the presence of stricture should be suspected and searched for. The mucoid or muco-purulent discharge is due to granular patches or ulceration in the vicinity of the stricture.

9. When this symptom is present copulation with a healthy female may excite a temporary urethritis resembling a fresh attack of gonorrhœa, for which it may be mistaken, especially after illicit intercourse.

10. There is sometimes a peculiar sensation of a creeping, crawling, or fluttering character felt in the urethra when stricture is present.

11. There may be pain of a scalding character in copulation during the emission of semen, and a few drops of blood may pass immediately after the act. In cases of tight stricture there may be no emission of semen, which is forced back into the bladder, and flows away when the penis be-

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comes flaccid, or with the urine in the next act of micturition. Sterility may thus result.

12. There may be nocturnal emissions from reflex irritation. Partial or complete impotency may result from the enervating influence of the disease. And in some few instances excessive desire or even priapism may be induced by the reflex irritation of the stricture on the nerve-centre governing the sexual passions.

13. Sudden retention of urine may be the first symptom that attracts attention to the presence of stricture. This is always liable to occur as a result of chill, sexual excess, or errors in eating and drinking, causing congestion of the already narrowed canal, thus temporarily closing it up.

14. A peculiar train of neurotic symptoms is not unfrequently noticed; and, strange to say, these mostly occur in connection with strictures of large calibre. Neuralgic pains in the back and loins, the groins, spermatic cords, testicles, perineum, rectum, and lower limbs occur, frequently giving rise to malaise, nervous irritability, and mental depression—symptoms which disappear when the stricture is successfully dealt with.

With some or all of the above symptoms there will probably be a history of one or more attacks of gonorrhœa some years before, or of an injury to the perineum accompanied by passing of blood from the urethra.

These, then, are the ordinary symptoms of organic stricture. You will rarely find them all present in any particular case. A combination of a certain number of them will lead you to suspect the presence of this disease.

In cases of long standing, however, extensive pathological changes occur in the urinary tract behind the seat of the contraction. These conditions are attended by symptoms that will give an additional clue to the primary cause of the mischief. We will now examine these changes under the heading:

Secondary Results of Stricture.

There is no part of the urinary tract behind the seat of the stricture that is not liable to be more or less affected by the backward pressure resulting from the obstruction to the flow of urine.

The portion of the urethra immediately behind the stricture is, as a rule, the earliest affected. Here the canal becomes dilated and pouched, with thinned and ulcerated walls.

This part of the canal is never free from the presence of a few drops of urine. This urine eventually decomposes and chronic inflammation is set up, giving rise to muco-purulent discharge. Pasty phosphatic material from the alkaline urine is deposited here, and may conglomerate into a soft concretion. Or a small urate or oxalate calculus may be arrested at this point, which in a normal urethra would make its way out with the urine.

From the straining efforts of the bladder during micturition the thinned and ulcerated wall may give way, and sudden infiltration of a large quantity of urine take place into the perineal tissues and scrotum, resulting in septicæmia, sloughing of these parts, and death, unless early vent be given to it by free incision.

More frequently, however, a few drops of bacterial urine percolate through a ruptured follicle or fissure into the submucous tissues, giving rise to perineal abscess with resulting urinary fistula.

Congestion of the prostate may supervene, or inflammation of that gland terminating in abscess, from bacterial infection of its ducts.

The bladder is, however, the organ that suffers most frequently. If it remain free from inflammation, its walls, in the first instance, become thickened from compensatory hypertrophy to overcome the obstruction to the flow of urine; but eventually, under the continued backward pressure and constant straining, it becomes dilated, its walls get thinned, and the mucous membrane bulged out between the muscular fasciculi, pouches being thus formed, the inner aspect of the bladder presenting a honeycombed appearance when viewed through the cystoscope. In the saccules thus formed small calculi passing down from the kidneys may get trapped and grow into large ones.

More frequently, however, urine contained in a bladder that is never completely emptied decomposes from bacterial invasion. Cystitis is thus set up, which may continue for years, giving rise to great thickening of the walls with contraction of the bladder, so that only a small quantity of urine can be retained. I have opened and drained bladders of this kind on many occasions. The contents have invariably a fearful ammo-

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niacal stench. The walls are covered with thick, ropy, and flaky muco-purulent matter, in which are embedded particles of phosphatic grit, and not unfrequently a phosphatic calculus is formed.

The ureters become dilated and tortuous, with thickened walls.

The pelves of the kidneys dilate in the first instance as a rule, the pyramids get flattened and atrophied, the medulla and cortex compressed and sclerosed, and hydronephrosis may ensue. Eventually pyelitis supervenes, by infection from the bladder through the ureters, the substance of the kidneys is attacked, and suppurative nephritis with numerous pus foci sets in. This is the condition known as "surgical kidney,"—a condition which renders a surgical operation of any kind extremely dangerous, death resulting frequently from suppression of urine due to shock, or from congestion of the kidneys due to the anæsthetic.

Associated with tight stricture of the urethra, hæmorrhoids and prolapse of the bowel are sometimes found, brought on by the constant straining to pass urine. Under conditions of this kind the patient frequently loses control of the sphincter ani, fæces being passed involuntarily during the efforts at micturition.

Epididymitis and orchitis not unfrequently occur in connection with stricture, due to extension of the gleety discharge along the vas deferens, reflex irritation, or instrumentation.

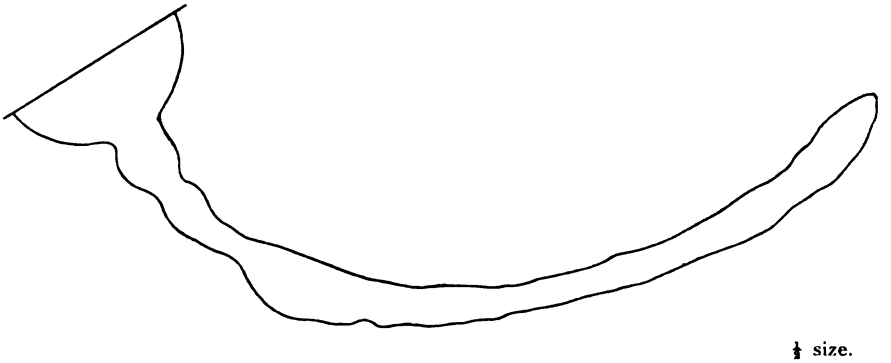
Finally, constitutional symptoms, due to the absorption of toxines from the ulcerated stricture or some secondarily affected part of the urinary tract, may occur in the form of paroxysms of fever, attended by cold, hot, and sweating stages, resembling in many respects an attack of ague. These paroxysms are particularly liable to occur in persons who have resided in hot climates like India, but they are wanting in the regular periodicity that characterises malarial fevers, and disappear on the cure of the stricture. This is a matter to which Sir Everard Home called attention nearly a century ago, and from personal observation I can endorse the accuracy of his views.

Diagnosis by Instrumental Exploration.

Having, then, come to the conclusion that the symptoms, taken as a whole, point to the probable existence of stricture as their cause, we next proceed to complete the diagnosis by instrumental exploration of the urethra.

No matter how strongly the symptoms point in this direction, no definite opinion as to the existence of stricture should be expressed until such an examination has been made, for by this procedure only can a certain diagnosis be established.

But in order that we may be in a position to detect any lesion of the urethral canal, we must first be familiar with its normal capacity. I have, at the opening of this lecture, briefly directed your attention to a few of the physical features of the urethra, but have purposely refrained till now from referring to its calibre.



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This rough sketch shows the normal calibre of the urethra in the adult male. It is a tracing from the original plate in Sir Everard Home's work, published about a century ago. He injected melted wax into the urethra from the

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bladder in the cadaver, and on consolidation the wax was, of course, a true cast of the canal. No other method has since been suggested that conveys such a true estimate of the capacity of the urethra throughout its entire course. You will observe that contractions occur at three positions —behind the navicular fossa, at the bulbo-membranous junction, and at the neck of the bladder; and it is at these points that difficulty is sometimes experienced in introducing an instrument through the normal urethra. This difficulty is avoided by keeping the point of the instrument along the floor at the first-named position and along the roof at the other two.

For exploration of the urethra these olivary gum-elastic bougies (Fig. 1) are undoubtedly the

Fig. 1.

best. They are tipped with olive-shaped bulbs, the stems being many sizes smaller in diameter Metal instruments of the same pattern, either rigid or soft, are sometimes employed for the same purpose. I prefer the soft, flexible, gum-elastic ones, as less liable to cause pain or do injury, and more calculated to adapt themselves to the natural curves of the urethra.

In passing instruments of any kind through the urethra the horizontal position is the best. The muscles are more thoroughly relaxed than in the standing posture, and the risk of a fall from the patient suddenly fainting is thus avoided.

If you take a largish instrument,—say 21 or 22 French scale (= 12 English),—oiled and, of course, previously rendered aseptic, and introduce it slowly through the normal urethra, you will find that it glides along easily till the membranous portion is reached, the patient being conscious only of a slight sensation of heat or scalding, which is natural, and due to the peculiar sensitiveness of the mucous membrane. At this situation you will be aware of some resistance, and your patient of distinct tenderness, owing to the urethra being narrowed at this point, and to the fact that the canal is here encircled by the compressor urethræ muscle, which holds it, as it were, in its grasp. By gentle, steady, onward pressure, at the same time rendering the penis somewhat tense by drawing it on to the instrument, you will overcome this physiological resistance; and, after the bougie has passed the membranous portion, it will glide on easily and without pain through the prostatic portion and enter the bladder, the only sensation felt being a desire to pass urine as the inner orifice is reached. Withdraw the instrument just as slowly and gently as it was inserted, noting again the resistance offered by the membranous urethra to the return passage of the bulb.

In passing instruments of any kind through the urethra there are three cardinal maxims that should always be borne in mind—viz. not to use force, not to give pain, and not to draw blood. The first of these precepts is under our control; it may not be always possible to fully carry out the latter two in practice, for some patients are extremely sensitive, and certain conditions of the urethra are very painful and liable to bleed on the slightest pressure. Nevertheless, these ideals should always be aimed at.

We now pass from the exploration of the normal to that of the strictured urethra. This is conducted in a very similar manner. Commence as before with a large olivary bougie—No. 21 or 22 F.—passing it gently down the canal till you meet with the obstruction. If, after gentle pressure continued for a few moments against the face of the stricture, whilst the stem is held at various angles, the instrument fails to pass, withdraw it, before doing so, however, noticing the position of the stricture—whether in the penile, scrotal, or perineal portions of the canal—and measuring its distance from the meatus, the penis being relaxed—not stretched on the bougie.

It is possible that in the progress of the bulb through the canal to the point at which it comes to a dead stop, you may be conscious of the existence of one or more contracted bands through which the bulb just passes, though rather tightly, for in a large proportion of cases having gonorrhœa for their origin the stricture is multiple, a tight stricture in the deep urethra being associated with one or more of large calibre in the anterior portion. These bands will again make their presence felt by the resistance offered to the withdrawal of the bulb.

We next introduce a bougie several sizes smaller—say No. 16 F. (9 E.), and ascertain if this will pass readily through the obstruction.

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If so, we know that there is a stricture at this site in calibre intermediate between 16 and 22 F.; and by trying consecutively larger sizes we soon arrive at its exact capacity.

In withdrawing the bougie when the bulb is obstructed or caught we again measure the distance from the meatus. The difference between this and the previous measurement taken from the anterior surface of the stricture indicates its length. It must be remembered, however, that this is only an approximate measure of the length of the stricture—a measure, in fact, of the pronounced portion of the contraction only, for the urethra is, as a rule, more or less involved for some distance in front and behind this, the strictured passage being irregularly hour-glass in shape.

be met with in the deep urethra, there is a condition sometimes found in this situation, even in the normal canal, which I have already referred to,—viz. spasm, which may simulate organic stricture and not yield to these soft instruments.

To ascertain if this condition be present we select a fairly large solid steel dilator of this kind (Fig. 2)—say No. 18 F. (10 E), and, having warmed and oiled it, pass it as far as the obstruction and wait; no force is to be used; if the obstruction be due to spasm the simple weight of the instrument aided by the gentlest pressure will overcome this and carry it through. If it fail to advance we know for certain that a tight organic stricture is present.

We next bring to our aid these tapering bulbous bougies (Figs. 3, 3A) which, as will appear

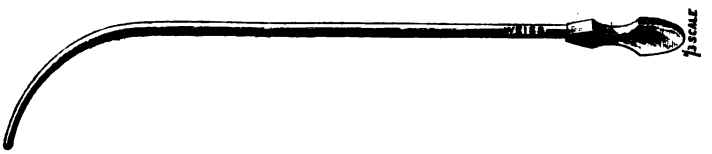

FIG. 2.

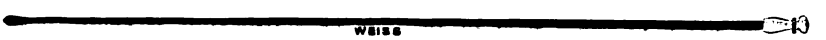

FIG. 3.

FIG. 3A.

Should No. 16 fail to pass, we try a considerably smaller bougie—say No. 12 (6 E.); and so on, down through the scale, skipping over several numbers at a time, so as to avoid unnecessary instrumentation.

The peculiar construction of these olivary bougies, which permits of the bulb alone being in intimate contact with the canal or stricture,—the narrow stem being quite free in the urethra,—their lightness and flexibility, enable us to gauge to a nicety the position, calibre, extent, density, and other characteristics of the stricture.

Should we fail to insert even the smallest of these olivary bougies—viz. No. 6 F. (2 E.),—for owing to the disproportion between the bulb and stem they cannot be made of lower grade,—we probably have to deal with a very narrow stricture. I say *probably*, because if the obstruction

later on, are the instruments *par excellence* for dilatation of stricture. There are no other instruments that can, as a rule, be so easily inserted through a stricture, but they do not, like the olivary bougies (Fig. 1), convey to the fingers a delicate appreciation of its calibre, extent and density. We select a No. 6 or 7 F. and endeavour to insinuate it through the stricture, employing smaller sizes, if necessary, till we accomplish our object.

For the purpose of measuring the capacity of the urethra, detecting the presence of strictures, and ascertaining their calibre, the urethrameter (Fig. 4) was invented by Otis. It consists of a series of small ribs which are projected in somewhat umbrella fashion by means of a screw in the handle, so as to form a bulb of varying dimensions at the end, the degree of expansion being

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indicated by a dial hand. This instrument is particularly useful when the meatus is narrow, for under such circumstances the olivary bougie that passes through this would fail to detect a stricture of larger calibre situated farther on. For instance, suppose a urethra, the general calibre of which is 30 F. with a meatus of only 18; a stricture in this canal of 22 could only be detected by the olivary bougies after performing a preliminary meatotomy, whereas the urethrameter would detect it at once. This instrument was very popular in America some years ago, though it is less so now. It never came much into use in England. I consider the olivary bougies as efficient for detecting and measuring stricture, besides being simpler and safer—though a preliminary meatotomy may be necessary. The urethrameter is not altogether devoid of danger, for the mucous membrane may be pinched between the ribs in closing the instrument. To obviate this a thin rubber sheath has been introduced, but this renders it so clumsy that only

FIG. 4.

strictures of large calibre can be measured, and not very accurately.

But if we can dispense with its use in the diagnosis of stricture, it is to this instrument, in the hands of the distinguished surgeon who invented it, that we owe a revolution in the surgery of the urethra and bladder, for it was Otis who first demonstrated that the urethra is much more capacious than was previously imagined, thus paving the way for a more rational treatment of stricture, and the introduction of litholapaxy.

Treatment of Stricture.

Having thus verified the existence of organic stricture by instrumental exploration of the urethra, the next question for consideration is that of treatment.

The aim, of course, must be to restore the canal to its normal capacity and maintain it in that condition. Many methods of treatment having this object in view have from time to time been introduced, some of them with merely a transient popularity. I shall only deal in detail with those that at the present time are regarded as of established value, of which there are five:

1. Dilatation by interrupted instrumentation.
2. Dilatation by continuous instrumentation.
3. Internal urethrotomy.
4. External urethrotomy.
5. Urethrectomy.

Now, one is frequently asked the question, What is the best method of treatment for stricture? The reply, of course, is that there is no particular method suitable to all cases. The different methods are not to be regarded as rivals. They are supplementary to each other, each having a useful sphere of its own, appropriate to particular varieties of the disease.

Dilatation, whether "interrupted" or "continuous," is undoubtedly the simplest and best mode of treatment for the great majority of strictures. It should almost invariably be attempted in the first instance, and only abandoned in favour of operative methods when, owing to certain difficulties or complications that may arise, it may be found inefficient or impracticable. It has the further advantage that it in no way militates against the employment of operative interference should such subsequently be found necessary. On the contrary, partial dilatation facilitates operation, for some varieties of which it is absolutely essential.

Interrupted Dilatation.

Dilatation by interrupted instrumentation consists in the introduction of instruments of gradually increasing size at stated intervals till the stricture is enlarged to the normal calibre of the urethra.

It is suitable for all cases of recent formation, whilst the organised lymph is more or less plastic, and not converted into dense fibrous tissue. Strictures situated in the bulbous portion of the urethra are, as a rule, amenable to this form of treatment, whether single or associated with one or more of large calibre in the penile portion.

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This method of treatment has the great advantage that the patient can pursue his usual avocations during its employment.

For this form of dilatation flexible tapering bulbous bougies (Figs. 3, 3A) are employed in the early stages. Rather stiffish instruments should be selected, for they can be rendered quite soft by immersion in warm water. The very soft varieties become so extremely limp after a short time in use that they are worthless for passing through strictures. There is, as already stated, no other instrument that can, as a rule, be so safely and easily introduced through the urethra. Somewhat similar bougies are constructed with conical tapering ends (Fig. 5). These should be avoided, for the sharp points are liable to get engaged in lacunæ and false passages, to obviate which the bulbous termination was devised.

Bougies, and, indeed, urethral instruments in general, are constructed according to two different scales—the French (or Charrière) and English. The French instruments increase in size by a millimètre in circumference, the number of the instrument indicating its circumference in millimètres, and they range from 1 to 30 or even higher. The ordinary range in England is from 1 to 12, though they are now made specially much larger. The measurements are arbitrary and do not follow any scientific rule as in France. Indeed, there is no uniform scale adopted in this country, the gauge of one maker differing slightly from that of another. The French scale possesses the following advantages:—(1) It is scientific and exact, so that if any particular instrument, say No. 10, is admitted through a stricture, we know at once that the calibre of the stricture is 10 millimètres in circumference. (2) The range is much more extensive than the English, commencing with much finer and ending with much larger instruments. (3) The augmentation is much more gradual, the increment in size between any two consecutive numbers being much less. Thus the English numbers 1 to 12 extend over the French numbers 3 to 21.

Method of Effecting Interrupted Dilatation.

Having at the first interview ascertained the calibre of the stricture by means of the olivary bougies (Fig. 1), we introduce consecutively one, two, or three of the tapering bulbous bougies (Figs. 3, 3A) till we arrive at that size, say 7 F., that just fills the stricture, passing easily, however, without the use of any force. The instrument is withdrawn, and the patient directed to return at intervals of two or three days. At the second interview we begin with No. 6, and follow this by 7, 8; on the third occasion pass 7, 8, 9; and so on, always beginning with a bougie one size smaller than the largest introduced on the previous occasion, and advancing to one or two sizes beyond it, as may be desirable, no stretching of the stricture, however, being permissible.

The instruments are withdrawn at once slowly. No advantage is gained by leaving them in the stricture for a few minutes; on the contrary, spasm, irritation, and even inflammation may be set up. It is only after an instrument has remained in for several hours, as in continuous dilatation, that spasm subsides, as will appear later on.

Fig. 5.

Having gradually dilated the stricture up to 18 or 19 (10 E.) by means of these flexible bulbous bougies, we lay them aside, and continue the process by means of the highly polished conical steel dilators (Fig. 2). The flexible bulbous bougies in the smaller numbers are soft and pliant, and adapt themselves easily to the contour of the urethra. The larger numbers are, however, rather stiff and clumsy, so that their points, which beyond the stricture are out of control, are liable to impinge against the floor of the prostatic urethra, cause pain, and sometimes be arrested there; whereas these large blunt steel dilators can be guided easily through the canal, and they possess a dilating power which does not appertain to the soft instruments.

The dilatation by these steel instruments must be continued till 15 or 16 of the English scale is reached, not 11 or 12, as is laid down in the English text-books, for Otis has shown that the

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urethra is much more capacious than was formerly imagined. Whatever method of treatment be adopted, whether dilatation or operation, we must not rest satisfied till the urethral canal is brought up to its normal capacity: otherwise the stricture is bound to recur.

When the stricture has been dilated to the normal capacity of the canal, full-sized instruments must be introduced at increasingly distant intervals—first weekly, then fortnightly, monthly, quarterly,— as the case may require, to ascertain that there is no recontraction; or if there be such to keep the stricture dilated.

Dilatation Rationally Explained.

Let us now inquire into the principles involved in interrupted dilatation of stricture. There are two distinct processes going on concurrently during the enlargement that takes place. Firstly, the successive introductions of several instruments of gradually increasing size effect a true expansion of the morbid tissues. Secondly, there is absorption of these tissues taking place at the same time. And in proportion as the latter process predominates will the good results be lasting. The simple contact of an instrument with the morbid tissues of a recent stricture, without the employment of any undue pressure, induces softening and absorption of that tissue. In proof of this the following facts may be advanced:—(1) If a small instrument that just passes through a stricture, exerting no pressure thereon, be tied in for several days the stricture will have enlarged to such an extent that the instrument lies quite loosely therein, and one several sizes larger can be introduced with facility. (2) In many cases of so-called "impassable" stricture, if an instrument be introduced as far as the face of the stricture and held against or in its orifice for some hours, the morbid tissues will be modified to such an extent that a filiform bougie will pass readily into the bladder.

How the softening and absorption of the morbid tissues are brought about it is impossible to say definitely. It is presumed they are due to alteration in the nutrition of the tissues caused by an increased vascular supply induced by the contact of the instruments. However this may be, the fact remains that the simple contact of an instrument with the morbid tissues of a stricture renders them soft and easily dilatable, and at the same time induces absorption; and that these results are independent of any mechanical pressure.

On no account, therefore, should force be employed in passing an instrument for the purpose of interrupted dilatation. Not alone is it unnecessary; it is mischievous, and may be attended by danger. It causes splitting and laceration of the stricture, which renders the urethra intolerant of instrumentation. It may be attended by untoward results, such as ulcer, abscess, urinary infiltration, fever, and retention; and is invariably followed by recontraction of a more unmanageable type.

If a stricture is not dilatable without the employment of force in introducing instruments it is not a case suitable for this mode of treatment, and must be relegated to a cutting operation.

I have dwelt somewhat at length on the principles that underlie the cure of stricture by interrupted dilatation, because, though well recognised in France, they are scarcely understood in this country, where the process of dilatation is attributed to the mechanical pressure alone of the instruments employed.

Continuous Dilatation.

We now pass on to the consideration of "Continuous Dilatation," which consists in introducing an instrument through the stricture, securing it in this position, and replacing it by a succession of others of gradually increasing dimensions at intervals of one, two, or three days, till the normal calibre of the urethra is reached.

As the instrument remains constantly in the urethra, *catheters*—not bougies—must be employed for this purpose, in order that the urine may flow thereby; and these catheters should be soft and flexible, so that they may accommodate themselves to the contour of the canal and obviate pain. Later on we shall see that in cases of very tight stricture, however, where difficulty has been experienced in introducing even a filiform bougie or perhaps fine metal catheter, the instrument should not be withdrawn, but left *in situ* for a day or two, urine passing beside the bougie, till sufficient dilatation has taken place to permit of a small soft catheter being introduced and tied in.

For the purpose of continuous dilatation cylin-

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drical gum-elastic catheters (Fig. 6) are best, owing to the eye being placed close to the end of the instrument, so that the urine can flow without any considerable portion lying in the bladder, as would be the case were tapering bulbous catheters, in which the eye is necessarily situated about an inch and a half from the point, employed.

The patient must, of course, remain in bed or lying on a sofa during the progress of this mode of treatment, which generally lasts about a fortnight.

The following is the most practical method of securing the catheter in the urethra:—The instrument is passed as far as the neck of the bladder till the urine begins to flow. A spigot of wood is then placed in the end of the catheter. Two pieces of thick, soft, cotton cord, ten or twelve inches long, are tied at their middle round the catheter, at a point one inch from the end of the penis. The four ends are then spread out at equal distances along the penis and secured in this position by a strip of adhesive plaster three

Fig. 6.

quarters of an inch wide wound round the organ, some of the hair of the pubes being included, to prevent the plaster from slipping. The catheter should then be withdrawn slightly, so as to render the cords taut, and allowed to remain in that position till the patient desires to pass urine, when the spigot should be withdrawn and the instrument passed on just so far as to permit the urine to flow. The spigot is replaced and the catheter withdrawn as far as the cords will permit. By this arrangement the end of the catheter is never in the bladder except during the act of micturition, and irritation leading to cystitis is thus obviated.

The catheter should invariably be a size smaller than the stricture can admit; that is, it should fit quite loosely. Otherwise, if it fit tightly, the pain and irritation set up will render the treatment unbearable.

After the catheter has been tied in for some hours there will be a free flow of muco-pus from the urethra, due to softening down of the morbid tissues from contact of the instrument. Each time the catheter is replaced the anterior urethra should be syringed out with a weak solution (1 in 6000) of perchloride of mercury.

Continuous dilatation is employed under the following conditions:

1. When we fail to make progress with "interrupted" dilatation.

2. When speedy relief is required owing to the occupation of the patient.

3. When, owing to cystitis existing as a complication, continuous drainage through a catheter is required.

4. When, through age or debility, and particularly when disease of the kidneys is known or suspected to exist, an operation is inadmissible.

5. In tight strictures and such as involve difficulty in introducing instruments it will, almost invariably, be necessary to commence treatment by continuous dilatation, and when sufficient progress has been made to permit of the easy introduction of bougies, to continue the treatment by "interrupted" dilatation.

6. As will appear later on, continuous dilatation has almost invariably to be employed as a preliminary to internal urethrotomy.

In most cases, as soon as we have dilated a stricture up to 16 or 17 F. (9 E.) by the "continuous" method, the treatment should be completed by the passage of large steel dilators by the "interrupted" method. Thus it will be seen that these two modes of dilatation are frequently supplementary to each other.

During "continuous," as in "interrupted" dilatation, it not unfrequently happens that febrile disturbances accompanied by rigors supervene, which may necessitate the temporary or complete abandonment of this method of treatment. But its great drawback is the rapidity with which recontraction takes place, even when an instrument is passed periodically with a view to maintaining the calibre of the urethra.

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WITH DR. LEWIS JONES IN THE ELECTRICAL DEPARTMENT OF ST. BARTHOLOMEW'S HOSPITAL.

Chronic Disease of Spinal Cord—Hemiplegia—Sciatica.

GENTLEMEN,—I have spoken at some length on the electrical treatment of neuritis, and of one form of spinal cord disease, namely, infantile paralysis, because they are conditions in which electrical treatment is of special value. I will now refer briefly to some other spinal cord diseases, and say what little there is to be said about them, from the point of view of electrical treatment, I mean diseases such as sclerosis lateral or disseminated, tabes, chronic myelitis, etc., examples of which come here from time to time. Though I have treated many such chronic spinal cord cases for long periods of time, yet I cannot say that the benefits to be obtained from electricity in those diseases are apparent. Patients of this class have attended here regularly for long periods—some of them for six months—and, though a few may have declared that they were a little better, yet there has been little or nothing to show for all the time and trouble spent on them. Whatever the future may bring we must at least admit that with our present methods locomotor ataxy, lateral sclerosis, disseminated sclerosis, syringomyelia, and chronic myelitis are conditions which are not worth treating by electricity. To the treatment of tabes by electricity Professor Erb has devoted much attention, and many patients from this country have gone abroad to be under his care. Some of them have returned feeling much better for his treatment, though I cannot say that I have seen any case of cure. But I have had letters from one gentleman who is quite capable of making correct observations, and he wrote me at some length explaining the treatment, and said he had been greatly improved by it. But I gather that he is still the subject of tabes, just as he was at the beginning.

There is another class of disease which comes here for electrical treatment from time to time, namely, the class of "myopathic" atrophies. The diseases under this head have been supposed to be diseases affecting the muscles, and not their nerves or nerve-centres. Among them may be named pseudo-hypertrophic paralysis, and the form of muscular atrophy affecting the shoulder muscles, and called after Landouzy and Dejerine, and the progressive atrophy of the muscles of the legs and feet described by Charcot and Marie, and named after them, though it was also described in this country by Dr. Tooth almost at the same time under the name of "the peroneal type of muscular atrophy." Cases of all these types have received electrical treatment here for long periods, but without definite improvement. Some have considered that during the time of their treatment they held their ground against the encroachment of the disease, and it is therefore possible that electricity may have done some little towards maintaining their nutrition, but that is all.

The feature which characterises all these diseases and which makes it so hard to do anything for them, is that they are conditions of degeneration or decay. In a case of infantile paralysis we have to deal with a patient in whom the active mischief is over and gone, and the task before one consists in treating it so as to assist nature to repair the damage done by that past mischief. In these other spinal cord diseases and atrophies you have to deal with a condition in which the natural tendencies of the patient are downhill instead of up. All one can say in these cases is that sometimes electricity seems to retard the rate at which the degeneration progresses.

I should now like to say a little about the treatment of hemiplegia electrically. From time to time hopeless cases are sent to us for treatment, cases which nothing short of a miracle could cure; and among them we frequently receive old hemiplegics with marked secondary rigidity due to descending degeneration. It is very plain that such cases have grave permanent changes in the cord, and are impossible of cure by electricity. But though we have those disheartening cases, yet we also have hemiplegias for which we are able to do a great deal of good. After an ordinary attack of hemiplegia, which is not too severe, the patient tends to recover; gradually the paralysis of the arm and leg becomes less complete than it was at first, and in time patients who

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were at first laid up with their hemiplegic paralysis become able to get about. Some weakness of one leg, or of one arm, or a little awkwardness of speech may persist, but otherwise they seem to recover moderately well. That tendency to recovery in the less severe cases of hemiplegia can be very much helped by electrical applications. A patient who has had hemiplegia is often left with a degree of paralysis which is out of proportion to the actual destruction or damage done to his brain. Round about the damaged tract is an area which is placed out of action for a time, so that for a certain period motor impulses pass through that area badly. If you take a hemiplegic who is recovering rather slowly and imperfectly and give him electrical stimulation, you help the rate of recovery very remarkably. The treatment is by brisk peripheral stimulation of the affected limbs by means of the induction coil. Generally a marked gain of power follows the applications quickly, and progresses satisfactorily up to a certain point, which depends upon the amount of permanent damage done to the brain, and you will generally find that the greater part of the good which can be done by electricity to a hemiplegic will occur within two months of the time of beginning treatment. Therefore it is profitable and useful to treat your cases of hemiplegia by electricity, at least for a time. Here in this department we have a certain number of hemiplegias who are so satisfied with their progress that it is difficult to get rid of them. They continue to expect more and more improvement, and ask for further treatment, and are loth to believe that they have gained all that is possible.

Attempts have been made to influence the seat of the lesion in hemiplegia by electrical applications to the skull, but nothing definite has been obtained so far from that form of treatment, and the brain is probably better left alone in such cases, as it is quite possible to set up irritative changes in the brain by strong electrical applications. The treatment should be confined to electrical stimulation of the skin and muscles of the paralysed limbs by the induction coil; and it may be carried out daily, or every other day, so long as benefit continues to follow from it.

In considering the question of the treatment of painful conditions, such as neuralgias, sciatica, and the like, I would refer you to the general principles which were laid down. When I was dealing with the modes of applying electricity in general, I stated that the constant current or current from the cells, without makes and breaks —that is to say, a "stabile" or "labile" application,—and with the positive pole in contact with the painful part, was the general line to follow in the treatment of painful conditions. The labile application is a sliding of the electrode over the part to be treated, without breaking the circuit more often than you can avoid. But as you must remove the electrode occasionally to moisten it, you should do so in the way I show you, slowly, breaking the circuit after the electrode has been moved over the skin some distance, so as to bring it to a region which is fairly remote from the part which is most painful. For stabile applications, the electrode is held still all the time, and with these care must be taken not to blister the skin by too prolonged a contact. Reversals of current should be particularly avoided in the treatment of painful affections, and *a fortiori* the induction-coil current with its rapid interruptions is improper, except when a counter-irritant effect is intended. I am continually being told by patients with painful affections that electricity has been already tried for them, and that its effect has been to make them worse rather than better; and inquiry usually shows that in these cases the electricity has been applied to them in the form of an induction-coil current.

The commonest painful condition that you are likely to have to treat electrically is sciatica, because it is an obstinate complaint, and because it is so difficult to relieve it by means of drugs. The secret of success in the treatment of sciatica by electricity is to use large electrodes—about three inches in diameter,—the constant current, and currents of considerable magnitude, say twenty, thirty, or forty milliampères—and the active electrode is to be moved up and down over the line of the sciatic nerve, and in those parts especially where the patient feels the most pain. The indifferent electrode should be applied to the abdomen in the iliac region and should be shifted slightly once or twice during the application. As the pain sometimes extends down to the calf, and even to the ankle, these parts should receive some treatment, while the flexor aspect of the

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thigh receives the greater part of it. You must use large currents, because you are trying to convey the current to a deep structure, and must allow for the diffusion of current in its passage through the tissues. It is well to rub a little soap on the active electrode, so as to help it to glide smoothly over the surface. The active electrode should be made negative. Soap also has the effect of reducing the resistance of the skin, and therefore a better current is passed through the patient. The patient with sciatica will often experience immediate relief from the application. I have already adduced this rapid relief after electrical treatment in sciatica as a point in favour of believing that the effect of the current was, in part at least, due to a vascular effect in the region of the nerve, because the relief is so rapidly produced. After each later application you may expect a longer period of relief, until, at last, the relief is permanent. Recent sciatica usually responds promptly to electricity applied in the way I have described, though cases of old standing are often very tedious. It is a great mistake to lose time at the beginning of a sciatica. Rest, warmth, and electricity are the essentials of its treatment, and the more quickly they are brought to bear the better. You must never forget that sciatica may be a simple sciatica, or may be a reflex pain, or may be produced by some pressure on the sciatic plexus. Be careful, therefore, not to treat as sciatica something which is due to disease elsewhere, or to a tumour, or to an inflammatory condition in the pelvis. You will meet with such cases from time to time, and in all cases of sciatica you must be on the alert for them. It is believed that in sciatica there is at first some congestion in the sheath of the nerve, and that this may lead to adhesions, after a time; and while the state of congestion in the sheath of the nerve can be well relieved by electrical applications, it is far more difficult to do good when the case is a "stale" one with fibrous secondary thickenings and adhesions.

When sciatica has become chronic and subacute, one can sometimes relieve it by the application of the induction coil instead of the constant current. In that case the *rationale* of the treatment is totally different. Treatment by the induction coil is a treatment by counter-irritation, and sometimes proves useful in chronic cases. The effect of electrical baths with the alternating current is also very valuable in many of these old-standing cases. The rule here with our sciaticas is as follows:—Those which are severe are treated in the way indicated with continuous current until they are nearly well; then they are passed on for a few electrical baths (alternate current) to finish the treatment off. Thus, there is a stage in sciatica when they will benefit by a treatment which they will not tolerate in the acute stage. The same holds good more or less in other forms of neuralgic pain.

The methods of treatment described for sciatica are also those for you to follow in the treatment of other forms of neuralgia or neuritic pain. The so-called deltoid rheumatism, or neuritis of the circumflex nerve, and brachial neuralgia are examples often met with, and form admirable subjects for electrical treatment. The relief of painful conditions affecting nerves is an excellent field for electricity, if we except trigeminal neuralgia of the paroxysmal kind and migraine. In both these diseases electricity is only occasionally of service.

CASES DEMONSTRATED AT THE MEDICAL GRADUATES' COLLEGE AND POLYCLINIC.

By JONATHAN HUTCHINSON, F.R.C.S., F.R.S.

HERE is a patient, a woman æt. 55, brought by Mr. Hitchins. She was married at the age of eighteen, and four years and ten months afterwards she had a living child. It lived until four years of age and then died of measles. Two and a half years afterwards she had another child, who is present here, and who is apparently perfectly healthy. Eighteen months after that she had a miscarriage, and two years later there was a second miscarriage. As far as could be ascertained there was no further specific evidence to be obtained. She appeared to be perfectly well up to six years ago, at which time she noticed she had a little dermatitis of some description on one ear, and from that as a centre it spread more or less over the face. At the same time she noticed a considerable quantity of

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seborrhœa in the scalp. The affection had been entirely confined to the face for two years. Four years ago, however, she noticed for the first time that she had a lesion on the left arm, and that the tongue was fissured and ulcerated. Within the last twelve months she developed symmetrical lesions of the feet, and during the last month or two there have arisen somewhat deep fissures in the clefts of the toes. We can see at once that there is sclerosis of the whole of the tongue, and ulceration of it. If such a tongue were seen in a man and he was a smoker, we should expect such a condition. But this woman has not smoked. I do not think any one will doubt the diagnosis. The epithelium of the tongue is partly destroyed. Her daughter is thirty, and there is not the slightest symptom of syphilis in her. If we had not heard the history it would have been very difficult to decide whether this lupus appearance was syphilitic or tuberculous. Could we have decided which it was? I think any one acquainted with the appearances of the syphilitic form and the tubercular form would have said that this looked like the specific form, consisting of tubercles slightly ulcerated, but there is nothing anywhere which could be called apple jelly. A brown infiltration of the skin is characteristic of the tubercular lesion. This has an exceedingly abrupt margin everywhere. The affection involves almost the whole surface of the face and neck and part of the chest. It is an erythematous desquamative lupus. There are almost as many varieties of the syphilitic form as of the tubercular, and some of them do not ulcerate. The patient has had it six years, and it has travelled over the whole of the face, but yet there has been no notching of the nostril or ulceration anywhere. In places it almost assumes the characters of a psoriasis. This will leave the skin more or less scarred wherever it has been. It is very extensive on the back also, but very superficial. There are little pustules which have crusts on them. All these features fit in with the diagnosis of the syphilitic and not of the tubercular form. Then there is the fact that fresh patches have developed lately on her toes. In common tuberculosis we deny, if it has once developed itself, that any fresh patches appear. Patches have come recently on the toes, and that is common enough in the syphilitic form. Another point is whether there has been any tuberculosis in the family. My belief is that where there is syphilis and a tuberculous tendency in the family, the fact is stamped in the peculiar form which it takes.

Our next case is a baby, the subject of impetigo contagiosa after vaccination. The child was vaccinated on July 16th, and pustules were observed near the vaccination places on August 31st. From there the condition spread to the head over the left ear. The report says that several other children were vaccinated with the same lymph and there has been no trouble with them. Before the impetigo appeared the vaccination marks are said to have healed, except that one of the scabs was not quite dry and therefore had not dropped off. This affection is a form of dermatitis attended by a micrococcus, and it is most distinctly contagious. The child's fingers and the mother's may carry the pus to any part. It is entirely an external disease, and has nothing to do with the patient's health. Patients with delicate skins get the disease much more readily than others. The discharges from the vaccination lesions very often get infected with this form of micrococcus. It is easily curable by local means, but the treatment needs to be carefully persisted in. Parasiticides must be employed, such as the ammonio-chloride of mercury. The disease is very virulent, sometimes spreading through a whole family. It is also frequently conveyed by professional nurses, and that is a very important fact to remember. Nurses in a ward who attend on children so affected will often communicate it to others. If the child is at the breast it will infect the mother's nipple. There is not the slightest suspicion of any specific element here. Sometimes the infection is very subtle, and takes a long time to get rid of. In most cases the manifestation is in the form of a vesicle, not a pustule, that is to say, a little vesicle raising the epidermis and not deeply infiltrating the skin. It has been named infantile pemphigus, which is an unfortunate name, as it has nothing to do with true pemphigus at all. I have reported in my 'Archives' two outbreaks of it. One of them was in St. Pancras Workhouse, and it took some months to eradicate.

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* *Specially reported for The Clinical Journal. Revised by the Author.*

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WITH DR. HALE WHITE IN THE WARDS OF GUY'S HOSPITAL.

HERE is a woman æt. 25, who is the subject of extremely acute rheumatoid arthritis. I do not think I have ever seen a more acute case. The history is only of six months' duration. Her joints began to swell six months ago, and the swelling involved ultimately the hands, elbows, wrists, ankles, knees, shoulders, hips, and temporo-maxillary joints. The most striking effect of all was in the hands. When she came in, as you can see by her temperature chart, she was acutely ill. It is not often that we see cases of this affection so acute as to resemble rheumatic fever. But the difference between rheumatic fever and acute rheumatoid arthritis is very strikingly shown in her. Notice how the carpal and metacarpal joints are affected, and this is characteristic of rheumatoid arthritis. Then, again, the temporo-maxillary joint is very rarely affected in rheumatic fever, and she has had none of the sweating or heart trouble which are so frequent with rheumatic fever, nor has she had any chorea, tonsillitis, or erythemas. But she did complain of what rheumatoid arthritis patients complain of sometimes, namely, a cold sweating of the hands and feet. When she came in she did not sweat anywhere except in the hands and feet. Another feature in such cases, which is very well shown in her, is the extreme degree of muscular atrophy, as shown in the arms, the legs, and very beautifully on the hands. The skiagraphs which have been taken show that there is as yet but little erosion of joints and very little formation of osteophytes. She illustrates another point, namely, that these very acute cases of osteo-arthritis occur in young people. Further, notice how entirely symmetrical the joint affection is. You have to remember that the muscular atrophy which we see in these cases is not due merely to disuse; it is a much more rapid atrophy than would be accounted for by that alone. If you

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were to keep your hand still for six months the wasting would not be so great as in this case in the six months. It can be produced experimentally in animals by damaging the joints, and it is met with quite irrespective of the kind of joint disease. It occurs much more in extensors than flexors; it is often very well shown in the hand; it affects the whole of the muscle; it gets well as the joint gets well; it is in some way dependent on the cord, because it is prevented in animals if the posterior roots are cut; and it obviously is not dependent on spreading from the joint to the muscle, for it is shown in the extensors of the wrist when that joint is diseased. I think the worst case of arthritic atrophy I have seen was one of gonorrhœal rheumatism, which on account of the muscular atrophy was mistaken for progressive muscular atrophy. By reading the text-books you would not have thought that the two diseases could have been confused. I fear this patient has acute rheumatoid arthritis so severely that she can hardly get well; it generally happens that such acute cases become helpless bedridden people. There has been no improvement in the joints whilst she has been here. These acute cases are rare and often lead to mistakes in diagnosis, this has made some doubt whether the disease really exists, but after seeing such a case as this you can hardly have any doubt.

This next woman is æt. 36. Eighteen months ago she noticed pain in the epigastrium. That pain has no relation to food, nor to time of day. The pain is worst when she lies on either side. It had been getting worse until two months ago, and from that time it became much more acute. Her legs have been swollen. She saw doctors, and as they did not relieve her she came to the hospital, and was taken in three weeks ago. We see she has a large tumour in the abdomen. It is hard and feels solid, and it extends from the ribs to midway between the umbilicus and the pubes, extending well into the right flank but not well into the left. There is a notch in its right hand lower border. The first thing we have to ask is, what does it feel like? I do not think there is any fluid in it. It is slightly tender, and it moves with respiration. We can get well under its lower edge. The edge is rounded and a little irregular, and the surface is also irregular, but there are no obvious lumps on it. The upper limit of the liver dulness in front is normal. The organ involved seems to be the liver, because the tumour extends down from well under the ribs; moreover the lower edge is very like liver, and has got a notch on it, and it moves up and down with respiration. Then there is the fact that it is uniformly dull, showing that there is no gas-containing organ in front of it, such as the stomach. Therefore we have to deal with a woman who has uniform enlargement of her liver. What are the causes of that. It might be one of the following conditions:—Hypertrophic cirrhosis, a big nutmeg liver from backard pressure from the heart, fatty liver, lardaceous liver, or leuchæmic liver, or a diffuse form of new growth. We can put out of court fatty liver because that feels soft, and there is no cause that we know of why she should have fatty liver. Leuchæmia we can get rid of, for there is nothing to suggest the presence of leuchæmia, and it would be exceptional for a liver to be enlarged like this in leuchæmia without the spleen also being involved, and that is not the case here. As far as we know there is no cause for lardaceous liver in her, and in that condition also the spleen would be enlarged as well and she would have some albuminuria, which she has not got. Moreover, I think her liver scarcely feels smooth enough for that. We have therefore narrowed down the diagnosis to cirrhosis or diffuse growth. Now for a growth to be as extensive as this we should expect to find the patient very ill, and she is young for new growth, and it is a long history for growth with this absence of emaciation. We have said before that primary growth of the liver is very rare, and that it kills soon when it occurs. We have no evidence that it is secondary to anything here. So we are inclined to look upon it as a cirrhotic liver. The evidence in favour of that is that it has a sharp, hard margin; that it is somewhat rough, and it is uniformly enlarged. The tenderness may be explained by there being some capsulitis present. I think the probability is all in favour of hypertrophic cirrhosis of the liver. She is not jaundiced and she has no ascites.

This woman, æt. 50, is the subject of mercurial tremors, which are very rare. She works at dressing rabbit skins, and in doing this uses some mercurial compound. When she came in her

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hand trembled so that she could not do anything with it. I show you a specimen of her attempt at writing at the time. She also showed some trembling of the face and tongue. All her tremors were much more marked when she attempted to move the affected muscles, and a slight tremor in the legs only showed itself then. There was distinct weakness of the affected muscles and the tremor was worse when she was excited as, for instance, when a number of us were going round the wards. During sleep her tremors disappeared. We saw that the condition was not disseminated sclerosis, because with tremors so severe as this there would have been some nystagmus, and, further, her tremors were not wide enough or irregular enough for this disease. It was not paralysis agitans, because she showed none of the characteristic attitude due to rigidity, and there was hardly sufficient paresis. It was obviously not chorea, and the movements were too regular for hysteria; nor was there the fine tremor of an alcoholic. Nor was there any evidence that the case was one of early general paralysis. Mercurial tremor is always far more marked in the hands and forearms than elsewhere, and the next most common sites are the face and tongue. She illustrated well that the loss of muscular power is not great. Mental and sensory symptoms are rare; this woman did not show any, but they may occur. Mercurial tremors are most frequently produced by the vapour of the metal, and are not, as a rule, accompanied by any of the signs of inflammation of the mouth, such as swelling of the gums, the metallic taste in the mouth with salivation, and the falling out of the teeth. These signs more frequently follow swallowing mercurial compounds, and were frequent in the days when patients were overdosed with mercury. These patients suffering from mercurial tremors recover very slowly, and this patient well illustrates that fact, for she has been here many weeks and still shows some tremor.

This patient is a woman æt. 28. The interest of the case is that if you go over the chest you find she has every sign of fluid in it. The illness came on quite suddenly on last Sunday week, and she had a shivering. She was perfectly well until seized with a rigor and pain in the right side. Four days after, when she came in, she had the signs of considerable fluid on the right side and a high temperature, and because of that and the suddenness of the onset and the initial rigor, I have all along suspected that it was a case of pneumococcal pleurisy, due to pneumococcal infection, and that it would be more severe than many a pleurisy. That has been borne out by the result, because the temperature is still up and she looks very ill. If that suspicion is true, it is possible that pus has been formed, and there may be a pneumococcal empyema. Eight or ten years ago we had several such cases in here, in which there was severe and sometimes fatal pneumococcal pleurisy without any co-existent pneumonia. Dr. Washbourn investigated the bacteriology of them and published the result. These patients had an initial rigor and a sudden rise of temperature, with pain in the side, herpes and most of the signs of pneumonia, except that the signs in the chest were indicative more of fluid than of solid; but it is difficult sometimes to distinguish between solid lung and fluid in the chest. Some of the cases were so severe that the patients died, and we found that there was pneumococcal infection of the pleura. The general signs would be the same whatever part of the body was invaded by this micro-organism. All along I have been wondering whether this is a case in point, for we have no evidence of any pneumonic affection of the lung itself. I shall not be certain that it is not, even if there is not pus. Often the pneumococcus does not form pus; it never forms it in the lung. We shall not settle the matter by the nature of the fluid.

This patient is a man æt. 27. Six years ago he noticed that his legs dragged, in consequence of which he consulted a doctor, but he gradually got worse. Now he cannot do much work. The striking thing about his gait is that his legs are very rigid; it is not a paralytic walk, there is no weakness. Both legs are equally affected. His knee-jerks are exaggerated, and ankle-clonus is present. He has clasp-knife rigidity. One plantar reflex is extensor. What do we infer from these signs to be the state of the spinal cord? That he has got sclerosis of his lateral columns; and the next thing we have to find out is why they are sclerosed. The most usual cause for sclerosis of both lateral tracts is damage

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of the spinal cord. In that case the lateral columns below the lesion degenerate, inasmuch as the lateral columns are composed of the neurons from the cells up in the motor cortex, the long processes extending right down in the lateral columns. We have to find out whether at any part of their course the lateral columns are interrupted in this man; if so, the mischief is most likely in the cord, because the symptoms are bilateral. If it were unilateral it would be in brain. In his case there is no evidence of disease of the spinal cord which is damaging his lateral columns. Caries is the most common cause of damage. There is said to be some retention of urine, but we have not observed it, and probably the history in this respect is incorrect. There is no loss of sensation. That shows that he has not got complete transverse damage to his cord. He has got voluntary power over his legs; that, too, shows that there cannot be much local damage to the cord. There is a condition in which degeneration of the lateral columns occurs without any gross primary damage to the cord. You see it in association with general paralysis, and many people think that what is the matter in those cases is that the cells of the motor area there undergo degeneration, and as a consequence the fibres which depend for their trophic influence on those cells degenerate. A strong argument in favour of that is that sclerosis of the lateral columns is often associated with progressive muscular atrophy and with labio-laryngeal palsy, showing that when the lower group of motor cells degenerate the upper group degenerate. On the whole we come to the conclusion that the condition is primary spastic paraplegia, depending primarily on the degeneration of the cortical cells, but it is difficult to say that the degeneration may not be primary in their processes.

STEINLIN ('La Semaine Médicale,' No. 30, 1900), as the result of an extensive experimental study, notes that the consolidation of broken bones is greatly retarded by the absence of the thyroid gland. His research was actuated by the favourable result obtained by Gauthier, who was able to cure a case of false joint in the femur by the administration of thyroid extract. — *Therapeutic Gazette*, October, 1900.

CLINICAL LECTURES

ON

THE VARIOUS FORMS OF INTRA-ABDOMINAL SUPPURATION.

Delivered at Westminster Hospital

By A. H. TUBBY, M.S., F.R.C.S.,

Surgeon to the Hospital.

LECTURE V.

ON SUBDIAPHRAGMATIC ABSCESS.

GENTLEMEN,—We now turn to another form of intra-abdominal suppuration, a form somewhat rare, yet met with in clinical work from time to time, and, it may be added, sometimes unexpectedly. I refer to subdiaphragmatic abscess. It is only within the last few years that any connected account of it has appeared in the various journals and text-books. By subdiaphragmatic abscess is meant one which is found between the diaphragm and the neighbouring abdominal viscera; that is to say the pus may be between the diaphragm and the liver, between the diaphragm and the spleen, or it may be posterior to the liver, bounded by the liver in front, the diaphragm above and behind, and the reflexion of the peritoneum below. The causes of these abscesses are fairly clearly established. They are, perforation of the stomach or the duodenum from a chronic ulcer, abscess of the spleen bursting internally, suppuration in connection with the pancreas, liver, and kidney, and most frequently a tracking abscess from the appendix. In order to make the subject of subdiaphragmatic abscess plain to you, I shall take gastric ulcer as an example.

Gastric ulcer is of two kinds, the acute and the chronic. The distinction between the two is, that an acute gastric ulcer is the kind which forms quickly, is small in size, and likely to perforate extremely suddenly, or to give rise to rapid and violent hæmorrhage; in fact one may say that acute gastric ulcer is a rapidly eroding form of disease. As a rule an acute ulcer is small, and its margins are punched out, so that if it perforates it makes a big hole in the gastric peritoneum. A chronic ulcer is rather a different matter. It is, as a rule, a large ulcer with shelving sides and edges,

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having a funnel-shaped appearance. You will find the mucous membrane more eroded than the muscular coat, and if the peritoneum be exposed the muscular coat will be found to be more eroded than the subperitoneal tissue. At the bottom of the ulcer there may be either a thin layer of muscle or it may be only peritoneum. A chronic inflammatory process is going on, and as a result of it adhesive inflammation of the neighbouring peritoneum ensues, so that an attempt is made to raise a protective barrier against extravasation of the gastric contents. Sometimes when this barrier is completely formed, perforation of the stomach does occur, and then you find that the contents of the stomach are extravasated over a small local area, and as a result an abscess forms. The position of it must necessarily depend upon the site of the ulcer. Many of them are on the anterior and some on the posterior surface of the stomach, although opinions differ with regard to this point. If there be an ulcer on the anterior surface of the stomach it may be followed by an anterior subdiaphragmatic abscess; if there be one on the posterior surface there may be the posterior variety.

A chronic ulcer gives rise to a localised peritonitis or localised abscess, and the form of abscess which occurs is called subdiaphragmatic, but some people call it perigastric. This is not a good term, because pus in that situation may be due to splenic and pancreatic causes. The term subdiaphragmatic or subphrenic abscess, however, sufficiently indicates the condition. It is found that perforation of the stomach from ulcer occurs in 15 to 18 per cent. of all cases, and is relatively more common in males than in females. As a result of perforation of the viscus, some of the gastric contents become diffused into the neighbouring tissues and set up suppuration, which varies very much in amount. It also varies in the direction it takes, and in the extent, which depends on the presence or absence of encapsulation, for many of these cases fortunately become limited. A chronic ulcer may form an adhesion to the liver, the spleen, the pancreas, and the abdominal wall, which then form the walls of the abscess. On account of the peculiar disposition of the peritoneal folds the abscess is limited in its extent, and as these patients are frequently recumbent, a typical subdiaphragmatic abscess is formed.

If subphrenic abscess is due to perforation of the anterior wall of the stomach, the walls of the abscess are formed anteriorly by the abdominal wall and diaphragm, and posteriorly by the gastro-hepatic omentum, above by the diaphragm, below by the stomach, laterally by the adhesions of the liver to the diaphragm. It is of very large extent, and it envelops the anterior part of the liver in such a way that the anterior margin of the liver projects forwards into the abscess cavity or it may be limited to one side of the liver or the other. If it is right-sided it is bounded on the left by the suspensory ligament of the liver, and if it is left-sided it is bounded on the right side by the same ligament. Thus you have an anterior subdiaphragmatic abscess in three forms, namely, one, embracing the whole anterior part of the liver, the second only the right lobe, the third the left lobe.

Again, an ulcer may perforate the posterior wall of the stomach, and then it fills the lesser cavity of the peritoneum. The same kind of abscess arises from perforation of the duodenum. Suppuration once formed in the lesser cavity of the peritoneum may extend up behind the liver, and is therefore bounded in front by the liver and the gastro-hepatic omentum, and behind by the posterior parietal layer of peritoneum. When there is suppuration in the smaller cavity of the peritoneum the foramen of Winslow often is blocked by adhesions.

There is another variety which is post-peritoneal or extra-peritoneal. This arises from suppuration, either about the kidney, from a colic fistula, or suppuration in a diseased appendix, which tracks up behind the peritoneum towards the liver, and then gives rise to a form of subdiaphragmatic abscess, which is entirely outside the peritoneal cavity.

It is very important that you should be able to recognise the forms, so that you may be *au fait* with the symptoms.

With regard to the *symptoms*, firstly, the onset of subdiaphragmatic abscess is generally acute, and in this way the patient has a somewhat sudden attack of pain, which is due to extravasation, then there is subsequent formation of pus, and the patient becomes extremely ill within a day or two. More rarely the onset is slow and insidious. It is important to remember this, and I remember very

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well a case when I was clinical assistant to the late Dr. Moxon at Guy's. The patient was a girl with gastric ulcer, and showed no signs of improvement. She seemed to be ill, but curiously and insidiously ill, and we could not find any symptoms to account for her weakness and progressive emaciation and rise of temperature. By one or two superficial and hasty observers she was suspected of malingering, and this view was expressed to Dr. Moxon, much to his indignation. The cause of her illness was not found out until the post-mortem examination, and it was then seen that there was posterior perforation of the stomach, and a subdiaphragmatic abscess which extended between the liver and the diaphragm and also wrapped round the spleen. But there were no definite signs during life, and the diagnosis was always doubtful.

The pain is often very acute, and is in the upper part of the abdomen, but subsequently it becomes well diffused, and vomiting is well marked. In these cases there is a considerable amount of dyspnœa, and this dyspnoea, with a combination of abdominal symptoms such as I have described, should put you on your guard. One cause of it is an implication of the muscular tissue of the diaphragm, so that there is myositis and a difficulty in breathing. Dyspnœa co-exists for another reason; inflammation of the pleura and empyema often result, and some of these abscesses burst through the diaphragm into the pleural cavity, and then the case becomes more grave. Pyopneumothorax is not uncommon. Many of these patients have a persistent cough. Therefore, if you have a combination of severe abdominal signs with acute chest symptoms, you are right in suspecting some lesion above and below the diaphragm and in immediate relation to it.

Next with regard to the signs. I draw this distinction between symptoms and signs. Symptoms are what the patient complains of; signs are what you notice by clinical examination. Symptoms may be said to be subjective, while signs are objective.

There is often bulging or swelling of the upper part of the abdomen. If the abscess is of the variety which envelops the anterior part of the liver, bulging is marked in the epigastrium. If it is on both sides of the liver, the bulging is symmetrical; if it is of the variety affecting one side or the other of the liver, then the affected side is bulging. If the abscess is of the second variety the bulging is rather lower, and extends well below the umbilicus. If it be the third variety of abscess, unless it is extremely large, there is absolutely no bulging of the abdominal wall at all. Thus the bulging, when it is present, is a very valuable sign indeed. At the same time you have to look carefully for it. The larger these abscesses grow, the more the widening of the sternal angle becomes, and the greater the bulging of the lower ribs.

On palpating, if the abscess is sufficiently large, you may be able to feel that there is a collection of fluid without a thrill. The presence of the thrill is typical of hydatid of the liver. The way in which the thrill may be obtained is by placing three fingers on the swelling and tapping the middle one, when you may feel a fine tremor in the others. If you have once felt such a thrill you will never forget it, for it is quite characteristic. The cause of the thrill is that the fluid is of low density and under very considerable pressure. There is no thrill in subdiaphragmatic abscess, because, as a rule, the fluid is thick, and the tension is not so great.

There is a very important sign in the anterior form, namely, a line of induration moving with the parietes. This is, perhaps, the most characteristic sign. The induration may be felt crossing the abdomen an inch or two below the anterior margin of the liver, and taken in conjunction with the other symptoms and signs is the most convincing of all. As to the origin of this line of induration, there is a spot where the extension of the abscess downwards is limited by the great omentum, which becomes inflamed and puckered, and so a broad line of induration forms across the abdomen. The late Mr. Greig Smith, whose experience in abdominal surgery was very great, regarded this sign as of more value than all others. He believed that if you find this line present, and can exclude tubercular peritonitis, you may safely diagnose subdiaphragmatic abscess.

In the posterior intra-peritoneal variety of abscess the induration is lower down in the abdomen, and the line of pus is lower. In the extra-peritoneal variety there is no line of induration at all.

The edge of the liver is displaced downwards, for it is easier for pus to displace the mobile liver downwards than to push the muscular diaphragm

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upwards ; indeed, the diaphragm will slough rather than yield. In subdiaphragmatic abscess you may feel the edge of the liver below the margin of the ribs, and it is surrounded by a layer of fluid, which is pus.

We will now deal with percussion. In the first variety, when the patient is supine the liver dulness is lost when there is a mixture of pus and air in the abscess. There is no liver dulness, despite the fact that the anterior margin can be easily felt, and it is depressed. The other conditions in which the liver dulness is masked are when there is acute perforation of the stomach with air in the peritoneal cavity, and if there be excessive dilatation of the intestines which override the anterior edge of the liver. If the abscess extend only over part of the upper surface of the liver, the lower edge can still be felt, and the liver is tilted somewhat. I wish you carefully to note that if there is a left-sided subdiaphragmatic abscess the heart's apex-beat is displaced outwards slightly, and the whole cardiac area is often resonant. That is a very interesting phenomenon. What is the cause? I presume it is that when you strike over the cardiac area you get reflected waves from the neighbouring resonant area.

In the extra-peritoneal form, unless the collection reaches the surface the percussion-note is useless as an aid, for the seat of trouble is too deep.

We now come to the question of *diagnosis*. It is important to differentiate subphrenic or subdiaphragmatic abscess from hydatid of the liver. Hydatid of the liver is a condition usually with a very long history, and there has been a swelling there for a long time ; and, unless it suppurates, hydatid of the liver is quite painless. Then in hydatid cysts you will sometimes feel a thrill, while on percussion the liver area is dull, and there is no general illness. On those grounds I think you can make the diagnosis. Sometimes, however, a hydatid suppurates, and if so the swelling remains dull, unless, as sometimes happens, it bursts into the thoracic cavity. It is important to diagnose subdiaphragmatic abscess from pancreatic cyst In the latter case there is an absence of any gastric history such as pain, indigestion, and so on, and there are no febrile symptoms. An important sign of a pancreatic cyst is the variability of resonance over it.

Now as to *treatment*. It is quite clear that the only means of any avail are operative, viz. evacuation of the pus. The objects are twofold—evacuation of pus and anticipation of the extension of pus into the thoracic cavity. It is very curious to note that these abscesses rarely burst into the peritoneal cavity, but almost always by preference into the thoracic cavity. Why it is so is difficult to say, but one may hazard this speculation : that it is more natural for the peritoneum to throw out a protective barrier by means of adhesions around the margin of the abscess than it is for the diaphragm to withstand the increased pressure. The more pus there is in the peritoneum the more inflammatory adhesion there is, and the greater quantity of pus the more likely is the abscess to burst through the diaphragm into the pleura. If you operate on the case, and if the cause be gastric ulcer, you must not attempt to close the ulcer at all ; as a rule it is situated too deeply. Any such procedure would need a prolonged operation, and these patients are not in a condition to withstand it. Besides, you may be sure that the walls of a chronic ulcer are in such a state of friability that it would be almost impossible for the sutures to hold, and even if you do get them to hold at the time of operation, they will probably break away later.

In doubtful cases the incision should be made in the middle line, because that is the spot which is most generally useful. If you are sure you are dealing with an anterior subdiaphragmatic abscess, the incision should be made in the abdominal wall over the most prominent part of the bulging, and always above the line of induration, when there is such. Remember you must not let pus into the general peritoneal cavity. So the incision is made either in the middle line or over the most prominent part of the bulging. Take care that you stop short at a spot where the dulness ceases. It is not very difficult to evacuate pus in the anterior variety of abscess. If there be a collection behind the liver, it may happen that the chest cavity has to be opened in order to enable you to reach the abscess. In doing so it is important you should prevent a general infection of the pleural cavity. Therefore resect the ribs, the eighth, ninth, or tenth in the mid-axillary region, and then attach the diaphragm to the edge of the incision before you perforate it. By so doing the pleural cavity can be cut off, and pus safely evacuated. A large drainage-tube is required for a considerable time.

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There are other routes for opening an abscess from behind, namely, an incision below the costal margins to the outside of the kidney, tracking into your abscess from there; or it may be opened from the front, and then you make an anterior incision, turn up the stomach, and with the finger tear through the gastro-colic omentum, and after packing the abdomen with iodoform gauze around your track, drain. It is very important after opening an abscess of this kind to irrigate well with sterilised water, and provide good drainage.

There is one point which ought to be mentioned. In many of these cases there is a dome-shaped dulness on the posterior aspect of the chest. This generally extends upwards in such a way that the highest part of the dome is on the lateral aspect of the chest, and there is between the dome-shaped dulness and the spine a long thin layer of resonant air-containing lung. This feature is more commonly met with in hydatids than subphrenic abscess.

This lecture deals with a very intricate subject, which you are sure to meet in your clinical experience from time to time; and I hope I have succeeded in focussing a difficult subject clearly.

Jaundice following Abdominal Section.—Jaundice may follow abdominal section, regardless of the condition for which the operation was done. It has occurred after the removal of one tube or ovary, both tubes or ovaries, an ovarian cyst, complete hysterectomy for fibroids, uterine cancer, and after appendectomy. It has developed after the most severe, complicated, and prolonged operations, or after those of the easiest and simplest character; after a lengthy and tedious convalescence, or after a recovery in which the symptoms were so mild and the disturbance so slight that the patient could hardly realise the necessity of remaining in bed. It has occurred after the use of every kind of suture material, but more frequently after the use of silk for ligating the pedicle. Very often it has appeared when there was suppuration and the formation of a sinus due to the infection of the pedicle ligature. It has not always occurred when a sinus existed, neither have all the cases followed the use of the silk ligature, but it has been at least twice as frequent after the use of silk as it has after using catgut. Neither the difficulty of the operation nor the kind of suture or ligature material used has appeared to affect the severity of the attack, nor to influence in any manner the course of the disease.—INGRAHAM, *American Journ. of Obstet.*

STRICTURE OF THE URETHRA: ITS OPERATIVE TREATMENT AND GENERAL MANAGEMENT.

By P. J. FREYER, M.D., M.Ch.,
Surgeon to St. Peter's Hospital.

(Lectures delivered at the Medical Graduates' College, November, 1900.)

PART II.

The Treatment of Tight and Complicated Strictures.

IN describing the treatment of stricture by dilatation I have assumed that we were able to pass a fine tapering olivary bougie in the first instance with comparative ease. It may happen, however, owing to the extreme narrowness of the stricture, or its being complicated by the existence of false passages, or from other causes, that we may fail to pass one of these bougies.

We then have recourse to these fine filiform gum-elastic bougies of various shapes (Fig. 7), some tipped with tiny bulbs, others rather sharply pointed. We also employ these catgut cylindrical bougies (Fig. 8), some of them of extreme fineness. Sometimes you will succeeed with one variety, sometimes with another.

They are also made of whalebone. I believe these were first introduced in America by Dr. Bangs. I merely mention them here to warn you against their employment. I have completely discarded stiff filiform bougies from my practice, regarding them as dangerous weapons, more calculated to puncture the mucous membrane and produce false passages than to get through the strictured canal.

In the endeavour to pass these filiform bougies through a tight stricture a good deal of manipulation and manœuvring will frequently be necessary, and your patience will often be put severely to the test.

Render the bougie quite straight in the first instance, and introduce it as far as the stricture, the face of which is then searched by alternately advancing and withdrawing the tip of the instrument, endeavouring to engage it in the opening of the stricture, and then by gentle pressure and perhaps rotation to push it through the narrow passage.

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Should you fail in your efforts to do this, withdraw the bougie, and substitute one with the end bent at an obtuse angle to the stem (Fig. 9). To obtain the bend plunge the bougie into warm water, give it the necessary angle, and then plunge it into cold water, when it retains its new shape. With this bent bougie institute a methodical search for the opening all round the outer rim of the obstruction, for the orifice of the stricture instead of being centrally placed may lie at the outer margin.

These filiform bougies are also made bayonet-shaped (Fig. 10), and employed in the manner just described.

Having succeeded in passing a fine instrument of any kind through a tight stricture, it should not be removed, but tied in, and continuous dilatation had recourse to in the first instance.

The employment of filiform bougies with tendril or cork-screw terminations (Fig. 11), will sometimes be found advantageous in overcoming the difficulties connected with the passage of these very tight strictures.

The introduction of an instrument through a narrow stricture will always be facilitated by injecting warm oil into the urethra, so as to distend it. Some of the oil passes back through the narrow passage, lubricating its sides and possibly dilating it slightly, thus rendering the introduction of the bougie easier. Do not allow the oil to escape, but pinching the end of the penis between the thumb and forefinger of the left hand, introduce the bougie, endeavouring to manipulate it through the stricture whilst the urethral walls are distended by the oil.

One of the most serious difficulties that we may have to contend with when dealing with a stricture, whether tight or otherwise, is the existence of what is called a "false passage." A false passage results from a wound of the urethra produced during unskilful attempts to introduce an instrument, whether by a surgeon or by the patient himself. As a rule the opening into a false passage is situated on the floor of the urethra, and is most commonly found in the bulbous portion. This is due to the fact that the canal is here naturally dilated and somewhat pouched downwards, before it rather suddenly contracts to form the membranous portion, so that a natural barrier is thus formed, against which the point of a stiff instrument is liable to impinge, and, if unskilfully guided onwards, or force be used, to be driven through the tissues, which are in this situation loose and delicate, and so out of the canal. Imagining that the point of the instrument is still in the urethra, the surgeon may push it onwards so as to again enter the canal behind the stricture, or it may travel backwards between the prostate and rectum, and perforate the latter, or even the bladder. With

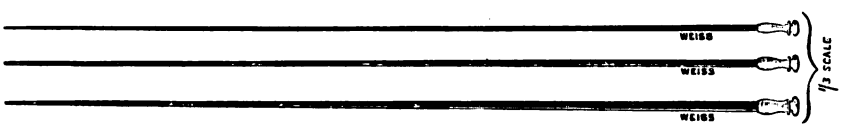

FIG. 7.

FIG. 8.

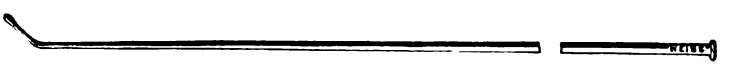

FIG. 9.

FIG. 10.

FIG. 11.

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rest and proper treatment such a wound may heal so that no trace of its existence be left; but in a large proportion of cases a small pocket or even canal running for a considerable distance, will remain,—a pitfall for the unwary or sometimes even the skilful surgeon.

Now, how are we to deal with a complication of this kind? We must avoid the aspect of the urethra on which the opening into the false passage exists, that is to say, we must, as a rule, guide the point of the instrument along the roof of the urethra. I fear the soft instruments, of which I am such a warm advocate in most cases, must be laid aside as not suitable to help us out of our difficulty. We must employ a rigid instrument, over the distal point of which we have control, and that rigid instrument will, as a rule, be a metal catheter, so that we may be definitely certain that it has reached the bladder, as indicated by the issue of urine through it, and not merely entered the false passage. When we have succeeded in manipulating a small catheter of this kind (Fig. 12), through what we conceive to be the stricture, the forefinger of the left hand should be inserted into the rectum to ascertain if the instrument is really in the urethra, in which case you will feel the thickness of the prostate intervening; whereas, if in a false passage, the catheter will be felt more distinctly, only the thin coats of the bowel lying between it and the finger, and it will probably be out of the middle line. If the catheter should be felt in the false passage, it should be withdrawn an inch or two, and again passed on, keeping its point close along the upper aspect of the urethra, and endeavouring by successive attempts to enter the stricture. You will recognise when the instrument has entered the bladder by your being able to rotate the point freely from side to side, and, of course, by the exit of urine if a catheter is used. Having succeeded in introducing a catheter, it should be tied in, for the case must be treated by continuous dilatation, at any rate till we have advanced to such a degree that an instrument of considerable size can be passed with facility. Cylindrical gum-elastic catheters (Fig. 6), armed with stylets may also be employed instead of the metal instruments. They are superior to the metal catheters for tying in the bladder, but being less rigid and highly polished they are not so easily guided in.

Another expedient that is sometimes had recourse to in cases of this kind is that of passing a bougie, engaging it in the false passage, and leaving it *in situ*. Another instrument is then introduced, the true orifice of the stricture is searched for and entered. Theoretically this procedure would appear sound and easy of execution; but in practice I cannot say that I have found it very efficient.

The urethroscope is of great aid in these cases of tight stricture complicated by a false passage. Introduce the largest tube that the urethra will admit, and after some manipulation you will bring the true orifice of the stricture into view by means of the reflected electric light. A fine bougie is then passed, engaged in the opening, and held there whilst the tube is withdrawn, and then coaxed through the stricture if possible.

Your first interview with a patient supposed to be suffering from stricture will generally be in your consulting room, or at the out-patient department of your hospital. Having diagnosed the existence of stricture, you will endeavour to pass an instrument of some kind through it. But you may discover that it is so tight, or otherwise complicated, that after several trials you find it impossible to introduce even a small filiform bougie as far as the bladder. You will, naturally, be disappointed, for, apart from the fact that no surgeon relishes being thwarted in his attempts to pass an instrument through the urethra, there is no doubt that the successful introduction of a bougie without pain through a difficult stricture at once commands the confidence of the patient. Do not, however, prolong the *séance* unnecessarily by persistent futile attempts to insert an instrument. Send the patient to bed, administer a brisk purgative, place him on light diet with absence of all stimulants, let him drink freely of demulcent fluids, such as barley-water, and give him an alkaline mixture combined with hyoscyamus, to remove acidity of the urine and allay spasm. If, after a day or two, you repeat your attempts at the introduction of an instrument, you will in all probability find that you will be successful. A loaded bowel and muscular tension due to walking exercise are calculated to produce congestion and spasm at the seat of stricture, which pass off under the regimen indicated.

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There is a simple device which I sometimes find useful in cases of very tight and intractable stricture. We will assume that unsuccessful attempts have been made to introduce a bougie, even after the patient has remained in bed for some days. The bougie enters the stricture, but no amount of coaxing will induce it to pass right through. Now in a case of this kind if we insert the bougie as far as it will go and leave it there, with instructions to the patient to look after it and prevent its slipping out, the probability is that after the lapse of three or four hours the instrument can be readily pushed through. An intelligent patient will second your efforts in this direction, and it is not improbable that on your return visit you may find that he has in the meantime managed to manipulate the instrument into the bladder. The continuous contact of the tip of the bougie with the morbid tissues dissipates spasm and induces partial resolution of the stricture.

When two or more distinct tight strictures are present, situated at considerable distances from each other, we may have much difficulty in inducing a soft bougie to travel through the canal, owing to its being gripped by the anterior stricture, so that we have no control over its point to manipulate it through the deeper stricture or strictures. Under these circumstances we must frequently have recourse to rigid bougies or catheters, preferably with slightly bulbous points (Figs. 12, 13). When the strictures are situated in the penile portion of the urethra straight instruments will be preferable. When with these instruments we fail to penetrate the deeper strictures, we must treat the proximal one in the first instance, and when that has been sufficiently dilated to permit of free play of the bougies, attack the next stricture. But fortunately, as a rule to which there are few exceptions, strictures, when multiple, diminish in calibre in proportion with their distance from the meatus.

A somewhat similar difficulty to that described in the last paragraph may present itself when the urethra behind a tight stricture is dilated, pouched, and distorted. This condition is particularly prone to occur in the prostatic portion, the mucous membrane of the floor of which may be reticulated and thrown into transverse folds, with deep lacunæ interspersed. In a case of this kind, after we have succeeded in introducing a soft instrument through the stricture, it may be tightly grasped, so that we have no control over its point, which in its onward course may get engaged in one of the lacunæ or folds, and no amount of manipulation will carry it into the bladder. To overcome this difficulty we must withdraw the instrument and in its place substitute one with a coudée end which, kept directed towards the roof, will facilitate its onward passage over the irregular floor of the urethra. But if the bougie has in the first instance been introduced with difficulty through the stricture it may be advisable to tie it *in situ* for a couple of days, the urine being passed beside it, at the end of which time the stricture will probably have sufficiently dilated to permit of the introduction of an instrument into the bladder. But here, again, it may be necessary to have recourse to a rigid instrument, the tip of which, after traversing the

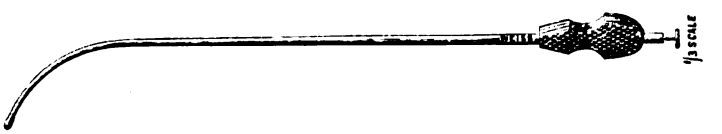

FIG. 12.

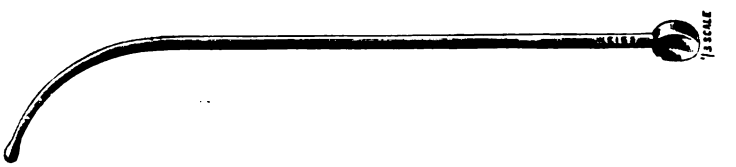

FIG. 13.

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stricture, may be guided over the prostatic obstruction by the aid of a finger introduced into the rectum.

When we have to deal with a tight stricture, and for any particular reason, such as threatened retention of urine or the existence of great irritability of the bladder, it is thought desirable to secure considerable dilatation at the first interview, there is no method of accomplishing this with greater facility and certainty than the following. A filiform bougie armed with a screw on its proximal end is first passed through the stricture; on to this is screwed a fine plated steel dilator (Fig. 14), No. 2, English scale; the soft conductor is then pushed on into the bladder, under an anæsthetic to enable us to introduce a staff for the purpose of performing external urethrotomy.

Another method of facilitating the introduction of a catheter in difficult cases is to screw a straight thin steel rod (Fig. 15) like a knitting needle on to a soft conductor. This is then passed through the stricture and a tunnel catheter slipped over the guide, which is then withdrawn, leaving the catheter *in situ*.

Finally, when all these various manipulations fail in our efforts to pass an instrument through a tight stricture, we may find that if the patient be anæsthetised we may succeed with ease in passing one, when it should be tied in and the

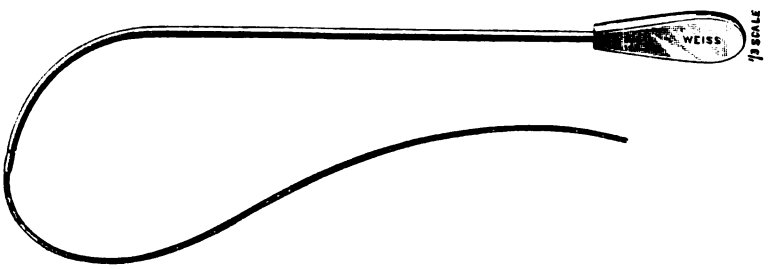

FIG. 14.

FIG. 15.

where it curls up, followed through the stricture by the metal dilator. The latter is then withdrawn and unscrewed, but the soft guide is left in the urethra. The next larger-sized metal dilator is then attached and passed in as before, and so on, till we have dilated the stricture to No. 5 or 6, English scale, when the guide is withdrawn and a loosely fitting catheter—say No. 4, English, tied in. This procedure can, as a rule, be accomplished without an anæsthetic, with the aid of a 5 per cent. solution of cocaine injected into the anterior urethra if necessary. We shall see later on the great advantage of this method of temporarily dilating a stricture treatment by continuous dilatation proceeded with.

We now pass on to the operative methods of dealing with stricture, of which the most useful and important is:

Internal Urethrotomy.

This consists in division of the morbid tissues by means of a cutting instrument introduced within the urethra.

The varieties of stricture for which internal urethrotomy is useful are:

1. Those situated at the meatus urinarius, and in the three or four inches of the urethra imme-

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diately behind this, particularly tough fibrous bands encircling the canal. It is found in practice that strictures in these situations are not very amenable to dilatation, and that they rapidly recontract, whilst, on the other hand, they are easily and safely cut.

2. Bridle strictures. These invariably recontract after dilatation.

3. Old confirmed strictures at the bulbo-membranous junction, of fibrous or cartilaginous consistence.

4. Strictures in which dilatation has been tried and failed, owing to the supervention of fever when we attempt to carry the dilatation beyond a certain limit.

5. Resilient strictures, which rapidly contract after dilatation, and cannot be maintained at or near the normal capacity of the urethra by the periodical introduction of instruments.

There are two distinct methods of carrying out this plan of treatment, both of which are associated with the names of eminent French surgeons:

1. Civiale's method, which consists in passing a sheathed blade through the stricture without the aid of a guide, the blade being then projected and the morbid structures divided from *from behind forwards* on the withdrawal of the instrument.

2. Maissoneuve's method, in which the incision is made *from before backwards* by means of a blade conducted along a metal guide previously introduced through the stricture.

Innumerable instruments have, from time to time, been devised for the purpose of carrying one or other of these methods into execution. I shall only describe one of each kind—that which I have found most practical—and the manner of employing it. Before doing so, however, I may mention that the simplest and best way of dividing a stricture at or near the meatus is by introducing a narrow director into the urethra, and along the groove of this a narrow-bladed knife. The stricture is divided on the floor of the canal as the knife is withdrawn. Or the bistouri caché (Fig. 16), may be employed for this purpose.

Fig. 16.

Civiale's Method.

Civiale's urethrotome (Fig. 17) consists of a grooved shaft terminating in a conical bulb. Within this bulb is concealed a sharp blade, which is capable of being projected by means of a mechanism near the handle to any extent required up to the maximum, and as easily returned within the bulb. The degree to which the blade is projected is indicated by a little button moving along a series of notches on the shaft near the handle.

Fig. 17.

As the bulb of this instrument measures ten of the French scale (5 E.), some preliminary dilatation of tight strictures is necessary to enable it to pass through. This is accomplished by "continuous dilatation," which generally occupies two or three days, a catheter of No. 10 F. being tied in the night before the operation. It is not advisable to dilate the stricture beyond this, so that it may oppose to the blade the largest surface possible, and thus facilitate its complete division.

The catheter is left in till the time of the operation, and on its withdrawal the urethra is thoroughly cleansed of the muco-pus that will be present, by injection from a syringe or irrigator of a solution of perchloride of mercury (1 in 6000).

The urethrotome, sterilised, warmed, and oiled,

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is then slowly and carefully introduced through the stricture or strictures, as the case may be, till its end is felt quite free in the bladder by the movement of the handle from side to side. This urethrotome, you observe, is quite straight; but with a little practice a straight instrument is as easily passed through the urethra as a curved one.

The instrument is now withdrawn till the heel of the bulb impinges against the posterior aspect of the stricture, the blade is projected to the required extent with its edge towards the floor of the urethra, and drawn smartly through the morbid tissues till all resistance ceases, when it is again sheathed. If other strictures exist nearer the meatus they are treated similarly before the withdrawal of the urethrotome.

The position of the strictures will have previously been ascertained by means of the olivary bougies, and their distances from the meatus noted, so that at the time of the operation we know where we are likely to meet with resistance to the bulb.

To ascertain if the stricture has been thoroughly divided a large steel dilator (Fig. 2), No. 24 F. (14 E.), is gently introduced. No force whatever should be employed, the instrument when properly guided falling by its own weight into the bladder. This is followed by Nos. 26 and 28 F. (15, 16 E.), which should pass as before without any force. If this latter pass easily the stricture has been thoroughly cut and the operation is completed.

But if any obstruction be offered to any of these steel dilators, the urethrotome should be again introduced and any uncut fibrous bands divided. These steel sounds are to be employed merely as measuring instruments, to ascertain if the morbid tissues have been fully divided up to the normal capacity of the urethra. On no account are they to be used as dilators. I hold that to partially incise a stricture and then dilate it still further is extremely bad surgery, and open to all the objections that have banished divulsion from modern practice. The success of this operation depends on the morbid tissue being completely cut through on one aspect.

Having satisfied ourselves that the stricture has been thoroughly divided we introduce a large silver catheter, No. 18 or 20 F. (10, 12 E.), draw off the urine and any blood that may have trickled into the bladder, and then wash out the latter with a saturated solution of boric acid by means of a metal syringe or irrigator. I formerly used solution of perchloride of mercury (1 in 6000), but found that it irritated the bladder, and induced constant desire to micturate when the patient woke from the anæsthetic; whereas our aim should be to have the bladder completely at rest, so that no urine may be passed for eight or ten hours after the operation, when plastic lymph and blood-clot will probably have sealed the wound and rendered it impervious to urine. I have not found the perchloride solution more effectual in preventing "urethral fever" than that of boric acid.

Maissoneuve's Method.

This (Fig. 18) is Maissoneuve's urethrotome, but I consider Tevan's modification of it (Fig. 19) the safest and most efficient for dividing the stricture from before backwards. A filiform flexible bougie, provided with a female screw at its base, is first introduced through the stricture into the bladder. The thin steel grooved staff is screwed on to this. The conducting staff is passed on through the stricture, preceded by the filiform bougie, which curls up in the bladder. The conductor is held steady by an assistant. The sheathed blade is now inserted in the groove of the metal conductor, and pushed along till the sheath is obstructed by the anterior surface of the stricture, when the sharp blade is boldly projected against it by means of the button at the end of the handle, cutting partly through the morbid tissue, and then allowed to recoil back into the sheath, which it does by the force of a spring in the handle. The sheath is again pushed further home and the blade is once more projected, and so on till all resistance ceases, the stricture or strictures being cut through. Care should be taken that the blade is not pushed as far as the prostate and the latter incised, or severe bleeding may ensue. The instrument is then withdrawn, followed by the filiform guide.

The introduction of steel dilators, to ascertain if the morbid structures have been divided, and the subsequent proceedings are the same as already described in Civiale's method.

As a rule an anæsthetic should be given for

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internal urethrotomy; but when this is contra-indicated the operation can be performed without one, with the aid of a 5 per cent. solution of cocaine injected into the urethra beforehand.

The patient must be prepared for the operation. He should remain in bed for a few days beforehand. The kidneys must be working actively, and the urine be free from albumin. The bowels should be opened daily by saline laxatives. If the urine be alkaline it must be rendered acid by the administration of ten grains each of boric acid and benzate of ammonia three times daily. All febrile disturbances must be subdued. Urethritis, if present, must be allayed.

In spite of all precautions, however, in a considerable proportion of cases of internal urethrotomy, an attack of so-called "urethral" fever will occur within the first thirty-six hours after the operation, usually immediately after the first act of micturition. The cold, hot, and sweating stages of malarial fever are exactly reproduced, the temperature generally rising to 103°—105° F. After considerable experience in India and in this country, I am unable to detect any difference in the symptoms and progress between a typical attack of urethral fever and one of the true malarial intermittent type.

Attacks of this fever are much more common

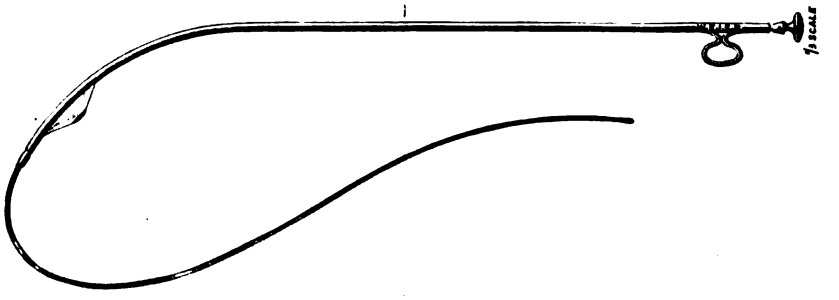

FIG. 18.

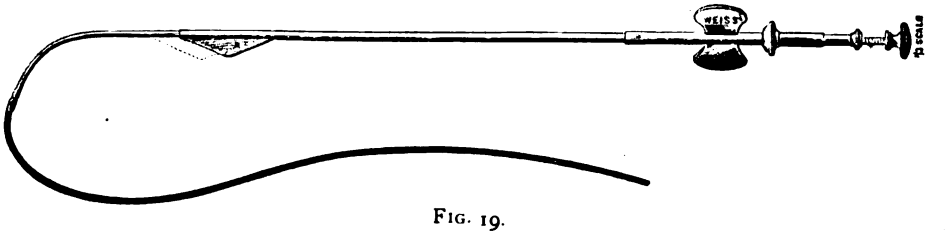

FIG. 19.

To obviate the occurrence of "urethral" fever, the operation room should be well warmed and the patient's limbs swathed in flannel, and on transferring him to bed a hot water bottle should be placed at his feet. On recovery from the anæsthetic he should have a draught containing five grains of quinine and fifteen drops of Liquor Opii Sedativus. Indeed, for a few days before and after the operation I am in the habit of giving ten grains of quinine daily in divided doses.

The patient is encouraged to drink freely of barley water for several days, after the sickness due to the anæsthetic passes off.

after internal urethrotomy in Europeans who have resided in malarial countries than in those who have never left Europe.

What the cause of "urethral" fever may be—whether due to septicæmia, disturbance of the central nervous system from urethral irritation, or to congestion and inhibition of the functions of the kidneys through shock of the operation, it is difficult to say. The subject is too abstruse and complicated a one to enter on here. The occurrence, though distressing to the patient and alarming to the inexperienced surgeon, is practically devoid of danger, provided the kidneys do

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not cease to work. Suppression of urine is a very serious complication and always indicates the previous existence of diseased kidneys.

The treatment of "urethral" fever is the same as that of malarial fever. Warm clothing, warm drinks, and hot water bottles in the cold stage, diaphoretics and diuretics during the hot, and avoidance of chill during the sweating stage. It is only when the temperature returns to normal that quinine should be administered.

I do not tie in a catheter after the operation, as was the practice some years ago. Its presence causes irritation and suppuration in the wound, and induces healing by granulation, which is to be avoided, leading, as it does, to subsequent contraction. It rarely prevented the occurrence for which it was employed, viz. the passing of urine over the wound, for the spasm of the bladder induced by its presence caused urine to flow beside the instrument.

The patient is directed to refrain from micturition as long as possible, generally eight or ten hours. When the desire is imperative, he should be placed in a hot hip bath and pass his urine for the first time there. Urethral spasm is thus allayed, owing to the relaxation of the muscles that is induced.

The patient must remain in bed for nine or ten days, after which he may recline on a sofa; but he should not leave his room for a fortnight after the operation. During the first four days he must not even go to the night stool, for fear of inducing hæmorrhage by the erect position.

The bleeding after the operation is, as a rule, of a trifling character, and consequently in the vast majority of cases no special measures are necessary for preventing this, beyond insisting on the patient remaining in the horizontal position for several days. Should there be a tendency to hæmorrhage, this will generally be arrested by passing a No. 24 F. (14 E.) stiff gum-elastic cylindrical catheter (Fig. 6) as far as the bladder and tying it in for two or three days. Should this be insufficient, a hard pad should be applied to the perineum—it is in the bulbous portion only that hæmorrhage of any consequence takes place—and braced tightly there by an ordinary pair of trousers-suspenders passing over the shoulders, the urine passing through the catheter. In one case only in my practice have I found these measures insufficient, a patient whom I only discovered after operation to be the subject of hæmophilia, in whom the incision was made on the roof of the urethra by Tevan's urethrotome. In this case I had to open the urethra through the perineum on a staff and tie a hard rubber perineal tube in the bladder for four days. This effectually controlled the bleeding, and the patient made a good recovery.

No instrument should be introduced till the wound has healed, that is till about a fortnight after the operation, when it will be found that, as a rule, steel dilators, Nos. 22 to 26 F. (13—15 E.), can be introduced consecutively with ease, without the employment of any force. The patient should be taught to pass these instruments himself, fortnightly at first, and then at increasingly distant intervals, lest the stricture should show a tendency to recontract.

In accordance with the teaching of Sir Henry Thompson and others, I was formerly in the habit of introducing instruments through the stricture every second day after the third or fourth from the operation, with a view to keeping the wound open during the healing process. I have for some years abandoned this practice. Not only did it cause the patient much pain and induce urethral fever, but it actually defeated the object for which it was employed, viz., the prevention of recontraction, by inducing irritation of the wound and healing by granulation.

I hold that when the ring of fibrous tissue which constitutes the chief element in stricture is thoroughly cut through in one direction, this more or less elastic band opens out; the cut ends separate, leaving a wide gap between them; free passage is made for the flow of urine; and the plastic inflammatory effusion in and around the scar tissue becomes gradually absorbed by a natural process, when the source of irritation, viz., the forcible current of urine against the posterior aspect and edges of the narrow opening, no longer exists. At any rate, I submit that if—as I am constantly verifying in practice—at the end of a fortnight the full-sized instruments I have described can be passed with facility and without pain, their repeated employment before this, with the pain and fever caused thereby, are unnecessary and mischievous.

(To be continued.)

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CLINICAL LECTURE

ON THE

CAUSES AND TREATMENT OF CONVULSIONS IN CHILDREN.

By MONTAGUE MURRAY, M.D.,

Joint Lecturer on Medicine at Charing Cross Medical School.*

GENTLEMEN.—This child is æt. 9½ years, and was supposed to be in good health until a fortnight ago, when, while on the way to school, he was suddenly seized with a fit, and was taken home in a condition of semi-stupor. The convulsions had then ceased. When brought to the hospital later in the day he was found to be suffering from mitral stenosis, which, as you will see from the distinct enlargement and over-action of the right side of the heart, must have existed before the attack. His right arm and leg were paralysed. There was no paralysis of the face at the time he was admitted to the hospital, and there was no history that any had previously been observed. His mental condition has considerably improved, but the condition of the arm and leg is absolutely stationary. The diagnosis, therefore, in this case is a straightforward one. A small piece of thrombus must have been detached from the diseased mitral valve, carried up the left carotid artery, and lodged in the Sylvian artery above the part which supplies the lower portion of the motor area.

I propose to utilise this case this afternoon merely as a peg upon which to hang a few remarks concerning the causes of convulsions in children, and the procedure which should be adopted with regard to them.

In the earlier months and years of life convulsions are frequently met with. Of these no classification, which is at the same time scientific and useful, exists. The principal point of practical importance in dealing with any given case

* Delivered at Charing Cross Hospital before the Post-Graduate Class.

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is to discover the share taken by the different causal agents in the production of the attack. For convenience of description these will be placed in three groups:—(I) Predisposing causes responsible for a certain instability of the nerve-centres; (II) Direct and often trivial removable exciting causes; and (III) Serious and often unsuspected organic disease.

I. *Predisposing Causes.*—(1) Age.—During the first two years of life convulsions may be induced by any of the exciting causes which will presently be enumerated, although it is usual to find more than one predisposing cause present. The influence of age gradually declines and, with the exception of hysterical convulsions, disappears at puberty. (2) Heredity.—The natural instability of the nervous system in infants is much greater in some cases than in others. Children prone to convulsions often show muscular twitching and hyper-sensitiveness to light and sound at the slightest provocation. In many instances this temperament seems due to abnormal conditions in the parents; and a family history of epilepsy, alcoholism, some one of the so-called functional nervous diseases, or some marked disproportion between the age of the parents is not infrequently present. (3) Rickets.—Convulsions occur so frequently in the subjects of this disease that it is generally admitted that one of the changes in rickets is an increased instability of nerve-centres. (4) Intra-cranial Disease.—The relation of brain-disease to convulsions is usually that of an exciting cause; but occasionally, when a convulsion is apparently due to some trivial exciting cause, the absence of other predisposing causes and the subsequent development of meningitis or new growth renders it almost certain that the irritant acted on nerve-centres, the stability of which was lessened by organic disease.

II. *Directly Exciting Causes.*—These are usually connected with the ear, the mouth, or the alimentary tract. Irritation of the external ear has been credited with the production of convulsions, but inflammation of the middle ear is unquestionably a commoner cause. Teething is occasionally the responsible agent, but only when some clearly recognisable lesion is present. Defective dentition may be associated with convulsions, but has no causal relationship except in so far as it is a manifestation of rickets. Irritation of the mucous membrane of the stomach and intestine is the most frequent of these causes. Stones and other foreign bodies, indigestible articles of food, and worms, especially ascarides, are the commonest sources of irritation. It must, however, never be forgotten that any irritation in ear, mouth, stomach, or intestine is unlikely to produce a convulsion without the co-existence of one or more of the predisposing causes already mentioned. Narcotic poisons, poisonous fungi, and burns may cause convulsions without the existence of any predisposing influence.

III. *Organic Disease.*—(1) Convulsions frequently mark the onset of acute febrile diseases, including not only the various exanthemata, but infantile paralysis either of the cerebral or the spinal variety. (2) A convulsive attack often preceded by muscular twitching may be the first indication of uræmia, especially in cases of unrecognised scarlet fever. (3) The circulatory disturbance caused by sudden collapse of a considerable portion of the lung, such as occasionally happens in whooping-cough, may result in a convulsive attack. Somewhat allied to this are the convulsions that may occur in post-diphtheritic paralysis. These are due to syncope, depending on heart failure, and are almost invariably fatal. In whooping-cough a convulsion may also occur as the result of intra-cranial hæmorrhage. (4) Organic brain disease including meningitis, new growths, and cortical vascular lesions, as in the present case, may lead directly to convulsions.

Diagnosis.—It is frequently impossible to make an exact diagnosis on the day a fit occurs. If an opportunity is afforded of observing the convulsion the following points should be first noted:—Whether the attack involves all the muscles generally; whether the convulsed parts are affected with uniform intensity; whether consciousness is absolutely lost, or to what extent the child can be roused; whether there is any change in colour—pallor or cyanosis; and whether the rectal temperature is much raised. When these points have been noted the previous history should be ascertained, including the age of the patient, the condition of its previous health, and the exact character of the onset of the present attack. Inquiries concerning previous health should include the possible occurrence of pre-

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vious fits, and the existence of sore throat, rash, whooping-cough, improper ingesta, vomiting, constipation, headache, and giddiness, and, in infants, rolling or retraction of the head. If the onset of the attack was observed inquiries should be made concerning the part first affected.

When the child is undressed its hands and feet should be examined for evidence of œdema and desquamation, its chest for signs of rickets, collapse of the lung, or pneumonia. As soon as the convulsion has subsided the limbs and face of the patient should be carefully examined for paralysis. If the mouth and urine are normal, and no satisfactory cause for the convulsion has been ascertained, the ears must be carefully examined. After twenty-four hours the temperature should be again taken, an ophthalmoscopic examination made, and any deviation from complete recovery noted.

The diagnosis in a case of convulsions must depend upon the discovery in this way of evidence of one or more of the exciting or predisposing causes already mentioned. It is practically useless to attempt to refer the case to any one of the special lists sometimes suggested. Even when due to local disease in the brain, convulsions in a child are usually general. If, however, the onset should be local, the distribution partial, the consciousness even for a time retained, and any weakness of the convulsed parts result, local disease of the brain or spinal cord is undoubtedly present, the nature of which must be determined in the usual way according to the evidence subsequently obtainable.

Prognosis.—As a rule convulsions are not immediately fatal. If, however, a series occur without any discoverable exciting cause, and without the presence of any known organic disease, the prognosis both as regards life and subsequent mental development is grave. When convulsions are incidents occurring in the course of organic diseases, they often mark the occurrence of some complication, and are accordingly of unfavourable omen; when dependent upon organic brain-disease complete recovery is rare and a fatal issue probable.

Treatment.—If any organic disease has been detected the treatment of the convulsion must be subordinated to that of the general condition. In the absence of such indications it is customary to place the child in a warm bath (95° F.), the temperature of which must be carefully adjusted, as in the hurry of the moment mistakes are liable to be made. The utility of the bath is unquestionable, and it is devoid of danger except when the convulsion is due to syncope or collapse of the lung. If the rectal temperature is high a somewhat cooler bath may be employed with advantage. Should a bath be contra-indicated, the child's clothes should be loosened and its position such that no accidental injury can occur.

In the majority of cases the convulsion ceases in the course of half an hour; by the time assistance is procured, drugs can generally be administered by the mouth. But when one convulsion rapidly succeeds another, or when unconsciousness persists, inhalations of chloroform, or rectal injections of chloral hydrate and bromides may be administered, except in those cases in which heart or lungs are affected. Indeed, the routine administration of drugs is only applicable when neither organic disease nor removable cause can be discovered. In such cases bromides, in large doses, and chloral hydrate, with or without digitalis, may be given by the mouth, and when these fail the administration of antipyrin and phenacetin is occasionally attended with good results. Emetics and purgatives may be needed to remove the contents of stomach or intestines. A grain of calomel placed on the tongue is often administered as routine treatment in all cases; in many of them with excellent results. If the fit does not recur it is still advisable to continue the administration of bromides for some days, combined with a light diet and as complete bodily and mental rest as may be possible.

Prolonged Application of Compresses of Ether on Strangulated Hernia.—Fiessinger ('Bul de l'Academie de Médecine,' October 30th,)—The remarkable benefits derived from the prolonged application of a compress kept moistened with ether on an irreducible, strangulated hernia are detailed in this communication. In from a quarter of an hour to two hours the hernia—whether inguinal, femoral, or umbilical—is reduced spontaneously with the assistance of slight digital pressure. The ether relieves congestion and induces reflex vaso-constriction. After thirty-six hours have elapsed there might be danger in reducing a possibly gangrenous herniated intestine. —*Journ. of Amer. Med. Assoc.*, December 1st.

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THE BLOOD-CORPUSCLES IN HEALTH AND DISEASE.*

By ARTHUR G. PHEAR, M.D., M.R.C.P.,
Assistant Physician to the Royal Free Hospital and to the Royal Hospital for Diseases of the Chest.

I HAVE, in the first place, to express my thanks to you for inviting me to give an address at this opening meeting of the Medical Society. The subject that I have chosen is a large one, but, considering its great and increasing interest, it seemed to me that this might be a good opportunity for bringing under review the most important facts in regard to it of which we are in possession.

I propose to give only a small part of the time at my disposal to the consideration of the *red corpuscles*. If one examines a fluid preparation of normal blood, one of the most striking things about these bodies, as was pointed out recently by Sherrington, is the uniformity of their structure. One may examine in detail field after field with a high power of the microscope, and each individual red corpuscle is in every essential point of size and shape the counterpart of its neighbour. The great importance of this, clinically, is obvious, since any departure from this remarkable uniformity is justly regarded as a departure from the normal, and as significant of some defect in the blood-state. There is one disease in which the red corpuscles display a higher degree of irregularity than in any other condition,—I refer to pernicious anæmia. Here every variety, both as regards shape and size, is met with. The corpuscles may be larger than normal or smaller than normal; they may be elongated into oval or pear-shaped bodies; they may be indented more or less deeply; and the outline of their misshapen forms has been compared to such unlikely objects as cocked hats, canoes, triangles, and balloons. This multiplicity of form, or "poikilocytosis," is not, however, in itself diagnostic of pernicious anæmia; for it is met with in some degree in every severe form of anæmia, whatever its origin—in the simple anæmia due to hæmorrhage, the secondary anæmia of chronic and wasting diseases, and the special forms of anæmia that are associated with diseases of the spleen, lymphatic glands, or bone marrow. For the diagnosis of pernicious anæmia we have, therefore, to look to other distinguishing points. One of these is a reduction in the number of red corpuscles out of proportion to the reduction in amount of hæmoglobin. For example, the number of red corpuscles may be reduced to 25 or 20 per cent. of the normal, while the hæmoglobin stands at, say, 35 or 40 per cent. of the normal; so that the amount of colouring matter in any individual corpuscle may be actually above the normal; and, as a matter of fact, it is not uncommon to find in pernicious anæmia small, ill-formed red corpuscles, or microcytes, deeply coloured by reason of the large amount of hæmoglobin they contain.

Another feature of pernicious anæmia is the presence in the blood-stream of red corpuscles containing nuclei. This, again, is not distinctive of the disease; for nucleated red corpuscles circulate in the blood in a variety of conditions, nor, indeed, are they so abundant in pernicious anæmia as in some other diseases. But there is more than one kind of nucleated red corpuscle. There are the *normoblasts*, being red corpuscles of normal size containing nuclei; the *microblasts*, or small nucleated red corpuscles; and the *megaloblasts*, or nucleus-containing red corpuscles, of a size that exceeds the normal. The last kind—I make the statement on the high authority of Ehrlich—is found in the blood of pernicious anæmia, and in this disease only; and it may be distinguished from the normoblast and the microblast not only by its size, but by the fact that the staining capacity of the nucleus is relatively feeble; the nuclei of the normoblasts and microblasts, on the other hand, have a high affinity for nuclear stains, such as hæmatoxylin or methylene blue, in solutions of which they become coloured intensely dark, sometimes almost black.

I must now go on to speak of the *colourless corpuscles*, and to discuss a few of the many interesting problems that are associated with their study. In the last edition but one of a well-known text-book of Physiology, the blood-corpuscles are described as being of two kinds, viz. the red and the white, and the possibility of there being more than a single variety of white corpuscle is dis-

* Delivered on October 24th before the Medical Society of the London School of Medicine for Women.

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missed in two or three lines, as being worthy of no extended notice. At the present time it is generally acknowledged and taught that there are present in the blood several kinds of white corpuscles which, in their mature or adult forms at least, are quite distinct and separate from one another, however closely they may be related in their origin. The demonstration of the various forms is simple enough. It is often thought that for this purpose one must have resort to complex combinations of stains,—that, in fact, the different forms of the white corpuscles can only be distinguished by investigating the chemical affinities of certain specific granules with certain specific stains. I do not for a moment wish to underrate the value of these methods, by which, no doubt, results of great interest and importance have been obtained, not to speak of the fact that Ehrlich, by his researches on the cell-granules, gave an immense impetus to the study of the blood-corpuscles in general. But the fact remains that the corpuscles may be differentiated without resorting to complex granule-stains. If a minute drop of blood be diluted with 40 per cent. alcohol and the preparation be examined as a fluid film, without adding any stain whatever, every variety of white corpuscle, with one exception, can be readily distinguished, and studied to advantage. The examination is facilitated by the addition of a small quantity of a nuclear stain, such as methyl green or methylene blue; the latter is the better of the two, as by its use the small cells containing basophile granules, which are rare in normal blood, and liable to be overlooked, are given a distinctive coloration by which they are easily recognised.

In preparing the fluid film the blood should never be drawn up into a pipette, as there is a tendency for the more adhesive leucocytes to stick to the walls of the glass tube, and thus the relative proportion of the several forms in the resulting preparation is seriously disturbed. The method that I follow is to draw up as much as is required of the diluting fluid in the pipette; then prick the finger, and touch the apex of the drop of blood which exudes with a perfectly clean glass slide, being careful to keep the slide from contact with the finger itself. Then slowly blow the diluting fluid out from the pipette on to the drop of blood, and allow the two to mingle. Wipe the end of the pipette, and then through it direct a column of air *on to the surface* of the fluid which lies on the slide. The effect of this is to ensure a thorough and rapid mixing of the blood with the diluting solution, and a square cover-glass is then placed over the fluid and the edges are sealed with vaseline. By this method a preparation is obtained which may be examined at leisure with the highest powers of the microscope.

Fluid preparations, in contra-distinction to fixed films, have this advantage, that by their use one can gain a truer perception of the shape and structure of the corpuscle than is the case with fixed films, in which there is inevitably some flattening and distortion of the corpuscles, and, in the case of the more fragile varieties, actual destruction. In the fluid preparation, the corpuscles lie in the supporting medium as unflattened bodies, free from the distorting influence of pressure. The thickness of the unflattened corpuscle is an advantage, as by slowly changing the focus from above downwards one obtains views of the cell at different focal planes, which are equivalent to a series of horizontal sections; and thus the relative arrangement of the different parts of the nucleus and of other structures within the cell can be studied with precision. The obvious objection to the fluid film is the fact that it cannot be preserved as a permanent preparation; but this difficulty may be met partly by making careful outline drawings with the camera lucida, and partly by preparing fixed films of a more permanent nature, with which the drawings can be subsequently compared. I would like to add, if I may, with regard to the drawing camera, that facility in the use of this instrument is an art the value of which it would be difficult to over-estimate. Moreover, with a little practice it can be easily acquired; and I hold that every one who has the interests of pathology at heart, should not only possess a drawing camera, but should know how to use it. The instrument has this great virtue, that it can tell no more than the truth; it supplies a record as full as you like to make it of what there is to be seen, and of that alone.

Of the normal forms of white corpuscle most are so familiar that I need do no more than make the shortest allusion to them. Commonest of all

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is the *polymorphonuclear corpuscles* (Fig. 1, *a*), usually more abundant than all the other forms

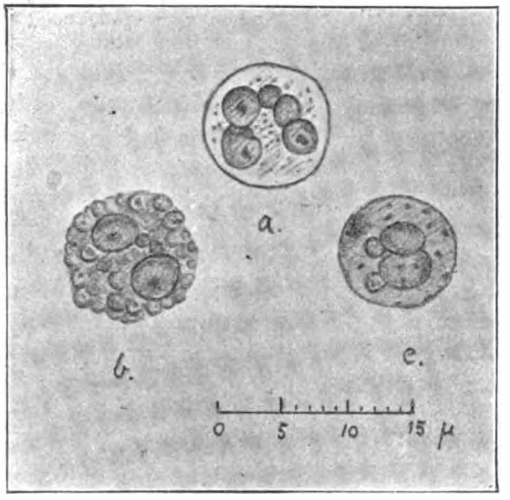

FIG. 1.
a. Polymorphonuclear cell.
b. Coarsely granular cell.
c. Basophile cell.
(The scale applies to all the figures.)

taken together, with its nucleus that appears to be multiple, but is, in reality, single, though wise resembling the lymphocyte; and *intermediate forms*, probably representative of stages in the growth of the lymphocyte into the large hyaline cell. In the third place there are the *coarsely granular* or *cosinophile corpuscles* (Fig. 1, *b*), peculiar for their protoplasm, in which are embedded coarse, highly refractile, round granules, which possess a special affinity for eosin and other members of the group of acid dyes, and even when unstained, give to the corpuscle a highly characteristic appearance. Two more kinds of white corpuscle remain to be mentioned: in the first place, *large cells, of oval shape* (Fig. 3),

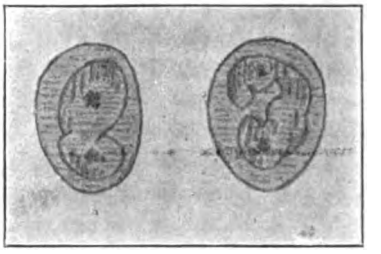

FIG. 3.—Large oval cells.

whose protoplasm stains diffusely with methylene blue, each cell containing a bulky nucleus,

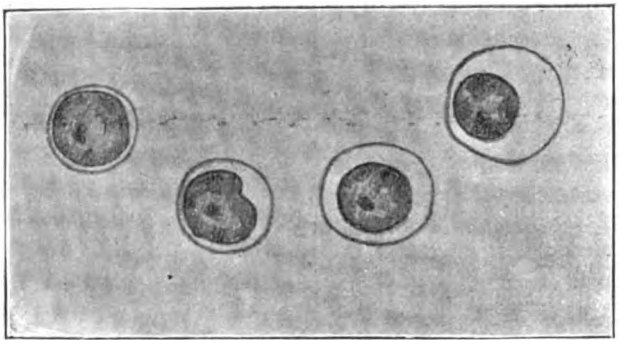

FIG. 2.—Lymphocyte, large hyaline cell, and intermediate forms.

curiously elongated and contorted; and with its protoplasm containing fine granules. There is, in the second place, the *group of hyaline cells* (Fig. 2), including the *lymphocyte* at one end of the series, and the *large hyaline corpuscle* at the other end; the lymphocyte with its deeply-staining rounded nucleus, often indented at one point; and its narrow rim of clear protoplasm, free from granules; the large hyaline corpuscle with its much broader zone of clear protoplasm, but otherelongated, often reniform, and of faint staining capacity; secondly, the *small cells containing basophile granules* (Fig. 1, *c*); and as but little attention is usually given to this last group, on account of the difficulties attending its demonstration, I should like to refer to it in rather more detail than I have given to the others. One of the characters of the basophile cell is a high degree of fragility, so that in dried films they are probably often destroyed in the process of making the film;

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and this may account for the statement sometimes made, that they are not present in normal blood. They are certainly not abundant in normal blood, but in small numbers I have never failed to find them in fluid films, prepared as I have described, with a dilute solution of methylene blue. They seldom constitute more than 1 per cent. of the total number of white corpuscles during health; though in certain pathological conditions, notably in myelogenic leukæmia, they may be present in higher numbers; in a case I had the opportunity of investigating a short while ago, there were 10,000 basophile cells to the cubic millimetre, which is about a hundred times the normal number; in a second case, probably of the same disease, there were as many as 70,000 to the cubic millimetre, or about seven hundred times the normal number. The basophile cell is among the smallest, and it is the rarest of the normal corpuscles. In contour it is usually rounded, rarely oval, and its diameter is about 8 μ. The nucleus is lobulated, consisting of four or more parts, which are sometimes spread out loosely in the cell, but more often are packed into a rounded central mass. The colour reaction of the basophile cell with methylene blue is quite distinctive, and of great interest from the fact that metachromatism is displayed to a marked degree, no part of the cell exhibiting the true methylene blue tint of the original stain. Thus the nuclear elements are stained rather feebly a greyish-blue or slate colour; of the extra-nuclear part of the cell, the protoplasm is faintly tinged with mauve; the granules embedded in the protoplasm are rendered conspicuous by their deep violet colour. In regard to size the granules are minute. As regards number, they show considerable diversity in the same individual at different times, though at a given time the degree of granulation in the different cells is fairly constant. When numerous the granules are aggregated in densely stained masses at the periphery of the cell, and their aggregation may give rise to an appearance of coarseness which is quite opposed to their true character. When less numerous the granules are discrete, and lie scattered through the cell-protoplasm. Another curious feature of the basophile cell is that it exhibits certain properties of *adhesion*; in fluid films it is seldom seen as an isolated cell, but usually lies in close contiguity to other cells, forming part of a small clump of leucocytes. The delicacy of its structure renders it liable to rupture, and individual cells are not uncommonly found with a portion of the protoplasm containing granules extruded from the main mass of the cell body.

So far I have made mention only of the healthy forms of white corpuscles. I will now ask your attention to the *myelocytes* and the so-called *large lymphocytes*, both of them abnormal forms, and unrepresented in healthy blood.

Myelocytes are remarkable for their similarity to cells that are normally present in the red marrow of bone, and on this is based the most likely theory as to their origin, in accordance with which they have been named. The myelocyte, as it appears in the blood (Fig. 4), is characterised

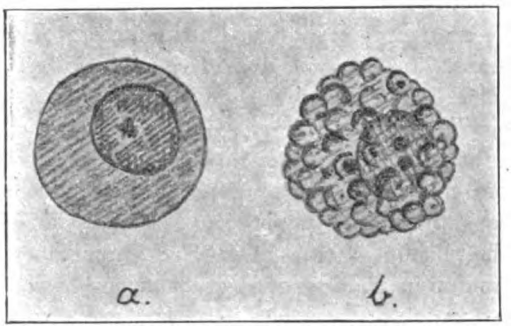

FIG. 4.
a. Myelocyte.
b. Myelocyte crowded with coarse granules.

by its large size, by its single, rounded nucleus, and by the granulation of its protoplasm. In general outline the cell is round, and the diameter usually ranges from 12 to 15 μ, though much larger individual forms are sometimes found. The *nucleus*, always single, varies a good deal in the proportion which it bears to the total bulk of the cell-contents; in some cases the myelocyte consists of little more than the large nucleus, for which the surrounding protoplasm forms a thin and scanty envelope; in other cells the protoplasm is abundant, and thickly clothes the nucleus. The rounded outline of the nucleus is often modified by a tendency to flattening on one side, and less commonly there is an actual incurving of the nuclear wall, in such a manner as to form a shallow bay. The nucleus stains

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with methylene blue only a little more deeply than the surrounding protoplasm.

In the *protoplasm* are embedded numerous fine granules, which are described, on the authority of Ehrlich, as neutrophile in their reaction to dyes, and as identical in their morphological and staining properties with the fine granules of the polymorphonuclear corpuscle. I do not, however, here intend to enter on the obscure subject of neutrophile granulation; the matter is involved in difficulty, and it must suffice to say that on the similarity of the granules in the marrow cells to the granules in the polymorphonuclear corpuscles Ehrlich founds his attractive theory as to the origin and birthplace of the polymorphonuclear elements. Myelocytes are present in the blood in large numbers in myelogenic leukæmia; and as, with rare exceptions, they are not found in any number in other conditions, they are rightly regarded as characteristic of this disease. In the same disorder, myelocytes containing large eosinophile granules—the *coarsely granular myelocytes* (Fig. 4)—are often found in the blood, though never in such numbers as the more common finely granular form, from which they differ only in respect of the size and oxyphile reaction of their granules. The number of granules in the coarsely granular myelocyte is very variable; in some cells they are few and scattered, in others the protoplasm is so densely packed with granules that the general structure of the cell is almost completely obscured.

The only other abnormal kind of leucocyte to which I shall refer is the *large lymphocyte*, which makes its appearance in considerable numbers in the class of cases known as acute leukæmia. This uncommon disease has received special attention in Germany at the hands of Fränkel and others; and, as a series of cases has recently been published in England,* I would like, without going into detail, to give a brief sketch of the clinical picture, particularly as the disease is one that is liable to be overlooked. The symptom for which the patient usually seeks advice is a stomatitis, more or less severe. This is associated with a pronounced degree of anæmia, with rise of temperature. Enlargement of the cervical lymphatic glands is present at an early stage, and is no doubt in part secondary to the stomatitis; but it would seem that this is not the whole explanation of the enlargement, as in one case it was specially noticed that the glandular affection preceded the onset of the stomatitis; and at a later period of the disease the glandular enlargement becomes generalised, though the individual glands seldom attain any great size. The deep-seated glands are involved as well as the superficial ones. The spleen may be increased in size, but the enlargement is not great, and cannot always be detected during life. The examination of the blood discloses a leukæmia of a remarkable kind, the white corpuscles being greatly in excess of the normal, and consisting of an overwhelming proportion of cells that resemble lymphocytes, inasmuch as the nucleus occupies nearly the whole of the contents of the cell, but differing from lymphocytes by reason of their great size, and also in the fact that the nucleus stains feebly with methylene blue, and not deeply as in the case of the lymphocyte. Other cells are seen similar to these, but with a large enveloping layer of protoplasm. The normal forms of white corpuscle, especially the polymorphonuclear cells, are reduced in number; and it is significant that the reduction is not only relative, but often an absolute reduction, the number of these cells per cubic millimetre of blood being actually decreased. The total duration of the illness is seldom more than eight weeks, usually about six. We have, then, to recognise a definite disease, acute in character, short in duration, of which the leading features are anæmia, stomatitis, enlargement of the lymph-glands, first in the cervical region and later elsewhere, combined with the appearance in the blood-stream of large numbers of abnormal cells of a peculiar type, and sometimes an actual diminution in the number of the normal forms of white corpuscle.

(To be concluded.)

* Bradford and Shaw, 'Med.-Chir. Trans.,' vol. lxxxi.

A Simple Method for Writing Prescriptions for Children (by Dr. Max Huhner).—Cowling's rule is, divide the age at the next birthday by twenty-four. In order to avoid much calculation the author suggests that the prescription should contain exactly twenty-four doses, and the entire amount of the drug in any prescription will be the adult dose multiplied by the age at next birthday. —*New York Med. Journ.*, December 1st.

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A USEFUL PRESCRIPTION IN MIDWIFERY PRACTICE.

THE following prescription will be found extremely useful in midwifery practice, especially in primiparæ cases in the first stage of labour, where the patient is nervous, irritable, and hysterical, the os rigid and undilatable, and the pain intense and irregular—a condition of acute suffering without any marked tendency towards dilatation.

The combination of drugs contained in this prescription, while interfering in no way with the normal progress of labour, relieves the distress of mind, and unnecessary suffering so frequently common in the first stage in those women of neurotic temperament. At the same time, some of the drugs also act by assisting the advancement and progress of the case by improving and stimulating the muscular contractions and retractions of the uterus with a minumum amount of pain and discomfort to the mother.

The draught is also useful in multiparæ cases where labour has not actually commenced, but where irregular and false pains cause loss of sleep and nerve irritability, and other discomforts commonly met with in many cases some days previous to the onset of labour. The busy accoucheur, called in to such a case as depicted, can (after satisfying himself by examination of the patient that labour has not really commenced) administer the draught and retire home to his well-earned repose, with the sure and certain hope that his service will not be required for some hours at least, thus saving himself the annoyance of losing his rest by having to pay an unnecessary visit to the lying-in room.

PRESCRIPTION.

℞ Potassæ Bromidum ... gr. x,
Sodæ Bromidum ... ... gr. x,
Ammon. Bromidum ... gr. x,
Chloras Hydras ... ... gr. x,
Tinct. Aurantii ... ... ♏x,
Liq. Strychinæ ... ... ♏iij,
Tinct. Calumbæ ... ... ♏x,
Aqua Chloroformi... ... ʒj.
Misce.

CHAS. H. MILES, L.R.C.P., Etc.
Stantonbury.

STRICTURE OF THE URETHRA: ITS OPERATIVE TREATMENT AND GENERAL MANAGEMENT.

By P. J. FREYER, M.D., M.Ch.,
Surgeon to St. Peter's Hospital.

(Lectures delivered at the Medical Graduates' College, November, 1900.)

(*Concluded from p.* 128.)

WHAT are the relative advantages of these two methods of performing internal urethrotomy?

1. By the Tevan-Maissoneuve urethrotome any stricture, no matter how tight, provided we can pass the filiform guide through it, can at once be operated upon; whereas for Civiale's the stricture must be capable of admitting a No. 10 F. (5 E.) bougie, the size of the bulb of the instrument. A stricture can, however, as a rule be enlarged to this extent by "continuous dilatation" in two or three days.

2. Civiale's method is much less liable to be followed by hæmorrhage than Maissoneuve's, owing to the incision being on the floor of the urethra, which is much less vascular than the roof.

3. In the after-treatment it is easier to introduce metal dilators when Civiale's method has been employed, owing to the naturally even upper surface of the urethra being left intact, so that the point of the dilator can be kept in this direction as it passes along the canal; whereas after the Maissoneuve operation there is often a pit left at the seat of the scar in the roof, in which the point of the dilator is liable to hitch.

4. Tough fibrous bands are cut with more certainty by Civiale's instrument in drawing the blade rapidly through the stricture from behind forwards, than by the Tevan's in which the blade is pushed gradually backwards.

5. When the case is complicated by false passages, or the stricture is very tight, it may happen that there may be some uncertainty about the guide being in the bladder. But with Civiale's instrument, the stricture being partially dilated, its end can be felt free in the bladder.

6. The blade of Civiale's urethrotome is com-

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pletely under control at any stage of the operation, and can be projected to any desired extent, which is not the case with Tevan's.

Both operations are thoroughly sound and practical. I almost invariably employ Civiale's, regarding it as having superior merits.

Internal urethrotomy, when undertaken in suitable cases and the morbid tissues thoroughly cut through, I consider one of the safest and most important operations in surgery. I have performed it in some 450 cases with five deaths —two from suppression of urine, and three from pyæmia. By no other method of treatment are such permanent results obtained.

The question is frequently asked, Is stricture capable of permanent cure? My reply is emphatically in the affirmative. In a large proportion of strictures treated by internal urethrotomy, if that operation be properly performed—that is, if the morbid tissues be thoroughly divided—a permanent cure ensues. "Once a stricture, always a stricture," is a stock phrase handed down from the older surgical writers; and no doubt in the days of caustics, divulsion, and other imperfect methods of treatment it contained a strong element of truth, as it did even in comparatively recent times when the strictures were only cut up to 11 or 12 of the English scale. The morbid tissues, being only partially divided, rapidly recontracted unless kept open by the constant passage of bougies. Otis laid the foundation of modern practice when he demonstrated the large natural capacity of the urethra. For eighteen years, since I adopted litholapaxy and fully recognised the large calibre of the urethra, I have been in the habit of dividing the stricture freely in the manner I have described. Patients operated on by this method years ago are frequently turning up to see me, in whom I can find no trace of stricture, though all instrumentation has been abandoned. As, however, in a large proportion of cases dealt with, it is impossible to feel certain that every strand of fibrous tissue has been divided, it is advisable to introduce full-sized instruments at increasingly distant intervals for some time after the operation. When to abandon the practice is a nice question. The patient himself will generally solve it by ceasing to do so, when he finds that after lengthened intervals the instruments pass with ease.

External Urethrotomy.

This procedure consists in division of the stricture from without by means of a dissection carried down to the urethra from the perineum.

There are two distinct methods of accomplishing this, suitable, respectively, to different varieties of stricture.

1. That generally known as *Wheelhouse's operation*, employed when no guide or staff can be passed through the stricture. The urethra is opened in front of the contraction, the orifice searched for, and the morbid tissues divided on a director.

2. That in which the stricture is divided on a staff previously introduced through it.

The varieties of stricture in which this procedure is called for are:

1. "Impassable" strictures.

2. Cases complicated with urinary fistula, with inflammatory thickening of the perineum and, perhaps, scrotum.

3. Tight strictures accompanied by chronic cystitis with foul, alkaline, purulent urine.

In the previous lecture I described the various manipulations and artifices to which it may be necessary to have recourse to enable us to introduce an instrument of some kind through a tight or complicated stricture into the bladder. It is possible, however, that in spite of all the skill and patience we can bring to bear on the case we may fail to accomplish our object. We are then in the presence of what is termed "impassable" or "impermeable" stricture.

In proportion to the skill and experience of the surgeon will such cases be rare. Syme, indeed, laid down dogmatically that there is no such thing as an impassable stricture. He did not, of course, include that condition we occasionally, though rarely, meet with—complete obliteration of the urethra, which sometimes occurs after an accident in which the canal is lacerated or completely divided. But he maintained that, given the requisite skill and perseverance, an instrument can be introduced through any channel by which urine issues, even in drops. I thoroughly endorse this view under the conditions laid down. It must be remembered, however, that few surgeons are possessed of that experience and skill that will enable them to successfully manipulate an instrument through a tight and complicated stric-

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ture in all cases. Furthermore, even in the most accomplished hands, the patient will not always consent to lie up for the lengthened period, perhaps a couple of weeks, that the surgeon may be engaged in essaying to accomplish this difficult task. We must therefore reckon on occasionally coming across a case of stricture which is practically "impermeable," at least to the instrument of the surgeon.

In cases of this kind we must have recourse to external urethrotomy without a guide, or "perineal section" as it was formerly termed.

The procedure generally adopted in this country is that of Wheelhouse, who invented a special staff (Fig. 20) for this purpose. This staff, which is straight, is grooved on one side to within a fourth of an inch from the end, where a small blunt beak or button projects on the other side.

The hair of the perineum having been previously shaved and the patient prepared, he is placed in the lithotomy position. The staff is passed as far as the stricture, with the groove directed towards the perineum, and held steadily by an assistant. The tip of the staff is felt for, and an incision about two inches long made in the median raphé, its centre corresponding with the bulb of the staff, and the urethra opened for the extent of an inch in front of the stricture. The edges of the wound are held aside by catch-forceps, or by a loop of silk passed on either side through the margins of the urethra. The beak of the staff is then turned round and hooks up the upper end of the incision. All bleeding having been arrested and the wound carefully sponged, the face of the stricture comes into view, and the opening is searched for, and when found a small probe-shaped director (Fig. 21) is pushed through it into the bladder. The stricture is cut on its lower aspect by passing along the director a long narrow knife. The beak of a small blunt gorget (Fig. 22) is inserted in the groove of the

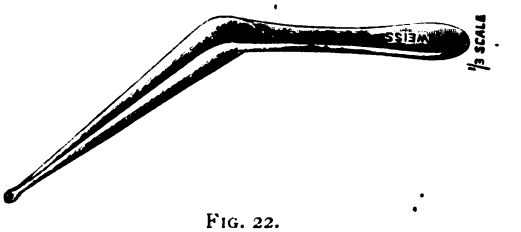

Fig. 22.

director and guided thus into the bladder. The staff, forceps, and director are removed, and a stout flexible catheter, No. 12 English, introduced through the urethra and along the gorget into the bladder, in which position it is fixed. Over this the edges of the wound are partially closed by silkworm sutures, and the dressings applied.

The catheter is retained for three or four days, or longer if it does not cause irritation, the urine flowing thereby. After its removal a full-sized steel dilator is introduced every second or third day whilst the wound is granulating, and at more distant intervals when it completely closes.

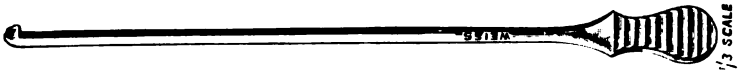

Fig. 20.

Fig. 21.

This is a sound operation. It is sometimes a difficult one, requiring much patience, owing to the trouble that may arise in finding the orifice of the channel through the stricture. A good light is essential, and all oozing of blood must be subdued before searching for the orifice. After this is found there may be difficulty in introducing the probe. One is, as a rule, inclined to hold the probe too vertically; if held rather horizontally it will slip through more readily.

Formerly I always employed the instruments used by Wheelhouse, but for several years past I have carried out this operation with somewhat different implements. I employ a straight staff

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(Fig. 23), grooved almost to the end, without any button. When the urethra is opened this is laid aside. A flexible bougie is passed by the urethra till half of it projects through the wound. This latter half is then bent up outside the scrotum and penis and both ends are held by an assistant. A loop is thus formed by the bougie, which holds the upper end of the wound steady, —more than can be said of Wheelhouse's staff, which is constantly slipping, the beak being too small to grasp the tissues boldly.

I have had filiform guides made to screw on to the probe-director (Fig. 24). The fine flexible guide is first introduced through the stricture, the director is screwed on and passed after it, the guide curling up in the bladder. It will frequently be found that a fine flexible guide traverses a tight strictrue more readily than a probe.

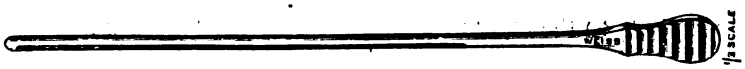

Fig. 23.

Fig. 24.

Fig. 25.

Syme's operation consisted in introducing a fine grooved staff (Fig. 25) through the stricture and cutting down on this from the perineum, the stricture being thus divided. The subsequent proceedings were the same as those already indicated in dealing with the preceding operation. The staff had a shoulder which rested against the face of the stricture, thus indicating its locality.

This operation was introduced by Syme for the purpose of dealing with all strictures that were not amenable to treatment by dilatation. As, however, the vast majority of these cases are best dealt with now by internal urethrotomy, Syme's operation has lost its *raison d'etre*, and is practically obsolete.

External urethrotomy on a staff previously passed through the stricture is now only employed for cases complicated with bad urinary fistulæ, or when drainage of the bladder through the perineum is necessary.

The following is the method of performing external urethrotomy which I myself practise when the stricture is traversable by an instrument.

The patient being anæsthetised and placed in the lithotomy position, if the stricture be a tight one I commence by introducing a flexible filiform guide, on to which is screwed a fine conical steel dilator (Fig. 14), No. 2 English scale. This is passed on after the guide, which curls up in the bladder. The steel dilator is then withdrawn and unscrewed, the guide being left in the stricture. The next larger sized dilator is screwed on, and passed as before; and so on, rapidly dilating the stricture till a fairly large sized dilator—say 6 or 8 E.—is reached, when the staff (Fig. 26) is screwed on to the guide and introduced into the bladder.

These staffs I had specially constructed with a short curve and tapering beak, a female screw being drilled in the end for the reception of the male screw of the guide.

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If the stricture admit a fairly large staff without dilatation the above preliminaries are, of course, unnecessary, and the staff is passed forthwith.

An incision a couple of inches long is then made in the median raphé over the site of the stricture and the dissection rapidly carried down through the perineum as far as the staff, and the stricture divided freely. The fistulæ are scraped, and all sinuses that communicate are laid open, their margins being scraped, or clipped off with scissors if ragged and unhealthy. A blunt gorget is then passed along the groove in the staff into the bladder to facilitate the introduction of the catheter, and the staff with the attached guide withdrawn. The tying in of the catheter and subsequent proceedings are the same as described in the previous operation.

When stricture is complicated by chronic cystitis with purulent ammoniacal urine, with or without the existence of urinary fistulæ, the bladder must be drained through the perineum. A small incision about an inch long and an inch in front of the anus is made in the raphé down to the staff. This incision should, if possible, be in healthy tissue and not involve a fistula. Through this a blunt gorget is passed along the groove in the staff into the bladder, and the staff withdrawn. A stout hard rubber perineal tube (Fig. 27) is then introduced along the gorget into

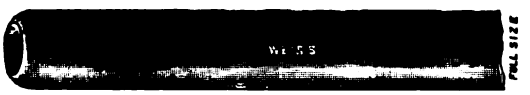

Fig. 27.

the bladder and the latter withdrawn. A rush of foul urine will take place through the tube as soon as it reaches the bladder, which is washed out with boric lotion. It will in most cases be advisable to withdraw the tube in order that the finger may be inserted into the bladder to explore for stone; for in cases of this kind it will frequently be found that a soft phosphatic concretion is present. This, if it exist, being removed, the tube is re-introduced and fixed in by means of a suture through the edges of the wound. The fistulæ and sinuses, if present, are treated as already described. The dressings having been applied the urine is conducted by a rubber tube, attached to the perineal tube, to a vessel beneath the patient's bed.

As to the treatment of the stricture three courses are open to us:

1. To extend the perineal incision and at once divide the stricture.
2. To deal with it by internal urethrotomy.
3. To leave it for subsequent treatment by dilatation.

Fig. 26.

If the stricture be single, tight, and deeply placed, it should be dealt with at once by extending the incision, so as to divide it thoroughly.

If multiple, the deep stricture can be dealt with by external urethrotomy, and the penile one by internal urethrotomy at the same time.

If single and not very narrow it is best left alone, and subsequently treated by dilatation. It will be found in such cases that when the urine is carried off by the perineal drainage-tube the inflammatory thickening in and around the stricture will rapidly subside. Absorption of the morbid products takes place, so that after ten days or a fortnight a good-sized steel dilator can be introduced with facility, and the stricture dilated by the gradual method. I have frequently verified this in practice, even when the stricture is comparatively narrow,—thus affording another proof that true absorption of the morbid products of stricture does take place, when the friction and

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irritation caused by the flow of urine against its contracted margins are removed.

The bladder should be washed out daily with boric or weak permanganate of potash solution, and the perineal tube not finally removed till the fistulæ have quite healed, when the artificial fistula—the track of the drainage-tube—is allowed to close, steel dilators, of course, being periodically introduced.

This is sometimes a tedious process, this fistula remaining open for months, and requiring to be stimulated from time to time by the electric cautery. I cannot at all endorse the light-hearted manner in which some surgeons write about external urethrotomy. In fact, I regard this operation as a necessary evil, to be had recourse to only when other measures fail or are found impossible.

Urethrectomy.

This operation consists in total excision of the morbid tissues which constitute the stricture. It is employed for traumatic strictures which are found intractable to other forms of treatment.

The preliminary stages of the operation are the same as for external urethrotomy when no staff can be passed through the contraction. When the face of the stricture is exposed a metal probe is introduced through its opening in the manner already indicated when dealing with external urethrotomy. The ring of scar-tissue is then resected by means of blunt-pointed scissors curved on the flat, the cylindrical section of the urethra involved in the stricture being completely removed. The severed portions of the urethra are brought together by sutures. The edges of the upper aspect of the urethra are first approximated by means of two or three catgut sutures passed through the mucous membrane and submucous tissues and tied within the canal. A gum-elastic cylindrical catheter, No. 12 English scale, is then introduced through the meatus as far as the bladder, and secured there. Outside this the margins of the sides and floor of the urethra are brought together by fine silk or catgut sutures passed through the submucous tissues after the manner of Lembert's sutures—not entering the canal. The surfaces of the perineal wound are then brought together over all by means of silkworm gut sutures, when the operation is completed, and the dressings applied.

The catheter should not be removed for three or four days, when it is replaced by another of similar size, very gently introduced, after irrigation of the urethra to remove any mucoid discharge that may be present. This second catheter should be removed on the third or fourth day; also the superficial sutures from the perineum, when union should have taken place. A steel dilator is passed once a week at first, and then at more distant intervals.

This operation is only practicable when the stricture is situated in the perineal portion of the urethra, where the traumatic variety usually occurs, as it is only here that the submucous tissue is sufficiently extensile to permit of the mucous membrane moving on it to such an extent that the severed ends of the urethra can be approximated without any tension being placed on the sutures. It is only applicable when the length of the stricture is not more than half an inch. The presence of pus in connection with the stricture also renders the prospect of success of this operation doubtful.

I have undertaken this operation in several cases, sometimes with complete success, sometimes with indifferent results. It is surprising the ease with which the ends of the divided urethra can be approximated without any undue tension on the sutures. The main causes of failure are the difficulty of excluding pus—which is almost invariably present at the site of the stricture—from the wound, and the danger of urine passing beside the catheter, thus infecting the wound.

I will, in conclusion, briefly allude to two other methods of treating stricture which at different periods in the past enjoyed considerable popularity, but which have now almost vanished from practice—I refer to "divulsion" and "electrolysis."

The first of these methods was best known in this country as "Holt's operation," and consisted in rupture of the stricture by forcibly separating the two blades of a split sound, introduced through the canal, by means of a wedge rapidly advanced between them. This operation has now disappeared from practice owing to (1) the difficulty in restricting the splitting process to the strictured portion of the canal, extensive

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laceration of the healthy mucous membrane frequently taking place; (2) the shock caused to the system inducing rigors and suppression of urine more frequently than by any other method of treatment; and (3) the rapidity with which recurrence of the contraction took place.

The electrical current has been employed with a view to inducing decomposition of the morbid tissues of stricture by electrolysis. Great results were anticipated from this process at first; but in late years it has fallen into abeyance, the results having been found to be only temporary. Instruments of gradually increasing size are passed through the stricture for the conveyance of the electrical current; and it is now recognised that to the dilatation thus induced, and not to the electricity, was due the temporary improvement that took place.

CLINICAL REMARKS

ON A

CASE OF LAPAROTOMY FOR THE REMOVAL OF INFLAMED AND SUPPURATING UTERINE APPENDAGES.

Delivered at St. Bartholomew's Hospital in September, 1900,

By C. B. LOCKWOOD, F.R.C.S.,
Assistant Surgeon to the Hospital.

GENTLEMEN,—Dr. Griffith has asked me to see this patient with the view of performing laparotomy. The patient is a housewife, her age is thirty-three, and she was admitted about the middle of August, because she was very ill, with great pain in the lower part of the abdomen. If you inquire, she will inform you that she has been unable to perform her household duties for many months. Observe that she is wasted and anæmic, and her night temperature is usually 100° or 101° F.; also her pulse is accelerated, and varies in frequency betwixt 90 and 100. The abdomen is slightly distended, and a hard and tender swelling can be felt above the pubes, projecting beneath the right linea semilunaris. This swelling is also felt *per vaginam*, fixing the uterus and filling the right side of the pelvis and Douglas's pouch. The diagnosis is an inflammation of the right Fallopian tube, the right ovary and right broad ligament, attended with the presence of pus. Some swelling is also felt *per vaginam* in the left side of the pelvis, but not sufficiently extensive to lead us to suppose that the left appendages are inflamed to any serious extent. It is probable that the illness ought to be attributed to a miscarriage which occurred nearly a year ago, which was followed by flooding and retained membranes, by a violent rigor, and by pain in the pelvis and iliac fossa. In addition, she is said, two months ago, to have suffered from pneumonia and pleurisy—not uncommon accompaniments of septic diseases in any part of the body.

The question now is whether the time has arrived to advise the removal of the uterine appendages. I am always most reluctant to take this step. I have seen considerable inflammatory swellings of the uterine appendages and broad ligaments entirely disappear without surgical intervention. In addition there is the fact that these operations are ofttimes of the most formidable kind, and, owing to adhesions, the intestines, the ureters, or the iliac vessels may be injured. Indeed, some of my operations for removal of uterine appendages have been the most arduous that I have ever been called upon to perform, and have reminded me of the more difficult operations for removal of the vermiform appendix. We would therefore, if possible, willingly avoid an operation in the present instance. But although the patient has been in hospital for six weeks, and has had every care and attention, she continues exceedingly ill, and Dr. Griffith reports that the pelvic swelling has increased rather than diminished—a fact which is compatible with the presence of pus. The alternative to an operation would be a long course of treatment, at the end of which she might be no better, or, indeed, might be worse and still require operative treatment. I have said nothing about the pain which she suffers, and which she will continue to suffer; but if you inquire she will tell you that she has constant pains in her pelvis and in her back. Having been informed of the state of affairs, she herself prefers to take the immediate risks of an operation.

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The swelling feels so hard and solid that I cannot help thinking the task will be a difficult one. But there is one good feature in the case, because in all probability it will only be necessary to remove the appendages of the right side.

At the operation the abdomen was opened by the usual median incision, a few omental and intestinal adhesions were separated, and the patient having been placed in the Trendelenburg position the contents of the pelvis came into view. First, a long and inflamed tube was found adherent to the sigmoid flexure. When this was traced upwards it ended in the cæcum, and was therefore the vermiform appendix. The true pelvis was entirely filled with an inflammatory mass, the surface of which was covered with recent lymph. At the first glance none of the usual pelvic contents could be distinguished, but after a little gentle separation with the finger the enormously thickened right Fallopian tube was found running over the top of the right side of the mass and disappearing into Douglas's pouch. A thick-walled and tense abscess lay in the concavity of the right side of the Fallopian tube, filling Douglas's pouch, and pushing the uterus upwards and towards the left. Using the enormously thickened and inflamed Fallopian tube as a guide, it, together with the abscess, was gradually separated from its connections in Douglas's pouch and drawn into the wound. The remaining step of the operation was comparatively simple, and merely consisted in securing the infundibulo-pelvic ligament and the rest of the right broad ligaments with three interlocking sutures, after which the inflamed tube and the abscess were excised. From the fact that no ovary could be discovered, it seems probable that the abscess involved that organ. As far as possible the separation was effected while the abscess was full and tense, but after a while a rent was made in it. Some horribly septic pus escaped, but was prevented from entering the peritoneal cavity by sponge packing. A large rubber drainage-tube was placed in the pelvis, and also an additional gauze drain. For a while after the operation this patient was very ill. The shock of the operation was followed by troublesome vomiting, and, in addition, a cough increased the pain; but the temperature and pulse speedily fell to normal and the pulse rate diminished, and now she is on the road towards convalescence. Her recovery, however, has not been quite uncomplicated, because there has been, for a short time, a small amount of fæcal discharge from the wounds. It is possible that the lower part of the sigmoid flexure was injured during the separation of the foul-smelling pus.

I have already said how difficult these adherent appendages are to remove, and I do not think that anyone could remove them unless he were familiar with a point in the morbid anatomy of the disease. I will draw upon the board a normal Fallopian tube and ovary. Observe it is somewhat different to that which is usually given in your text-books on anatomy. Notice how the Fallopian tube, after beginning at the uterus, runs outwards towards the brim of the pelvis and then turns downwards and inwards into Douglas's pouch, so that its mouth lies beneath the ovary, ready apparently, to catch anything that drops into it. Now when the Fallopian tube inflames, or becomes distended with pus or watery fluid, it not only increases in circumference, but also in length. As it elongates it pushes its way deeper and deeper into Douglas's pouch, and may at last turn upwards behind the uterus internal to the ovary. To remove such a tube as this the surgeon proceeds to withdraw the tube in the way reverse to that in which it attained its position, so that the finger is gently pushed at the back of Douglas's pouch and along the tube, its walls are gently separated until its end is felt, and then the finger is insinuated beneath it, so as to separate it from the uterus and the back of the broad ligament, and finally lift it up, together with the ovary, out of the pelvis. That is the manœuvre which you have just seen me perform.

The Action of Atropine upon the Secretion of Hydrochloric Acid of the Gastric Juice.—Dott. G. Gaglio finds that this not only paralyses the reflex gastric secretion, but also that produced by the presence of food in the stomach. His observations upon dogs seem to justify the use of atropine in persistent hyperchlorhydria or Reichmann's disease, as was first recommended by Ivanowitch and by Rummo.—*La Riforma Medica*, 1900, No. 160, p. 116. *Amer. Journ. Med. Sciences*, December.

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A CLINICAL LECTURE

ON

ANIMAL PARASITIC DISEASES OF THE SKIN.

Delivered at the Blackfriars Hospital for Diseases of the Skin, October 23rd, 1900,

By G. PERNET, M.R.C.S., L.R.C.P.,

Pathologist to the Hospital.

GENTLEMEN,—My intention to-day is to go through the diseases of the skin produced by animal parasites. Although it is a chapter in skin diseases which is somewhat neglected, it is in practice of very great importance indeed. I may preface my remarks by saying that what I have to tell you to-day will be chiefly of a practical nature.

I shall begin with scabies. The disease which goes under this name is due to the *Acarus scabiei*. There is one point about this parasite which I should like to emphasize. In some books on diseases of the skin it is stated that the acarus is an insect; this is not strictly correct. It belongs to the Arachnida. It has eight legs, whereas insects have only six legs. There are two pairs of legs in front armed with suckers, and two pairs behind armed with setæ in the female. The male differs in being a good deal smaller, and in that the four anterior legs are armed with suckers, as in the female, the third pair has got setæ, and the last pair suckers, which the male uses in copulation with the female. In the early stage of the acarus you get a six-legged embryo. The symptoms produced by scabies are those of irritation. The female burrows into the skin superficially; it remains in the horny layers of epidermis and but very seldom reaches the rete cells. As it progresses in the burrow it deposits the ova, from which the future acari arise. The male acarus, on the contrary, lives on the surface of the body entirely and does not burrow. It is very seldom one finds the male acarus, because he is a very diminutive creature. The female, which is larger, is only just visible to the naked eye as a minute

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bladder. The male is only found when there is a large amount of crusting such as you get in the so-called Norwegian itch, which sometimes affects lepers. These are very neglected cases. The symptoms are those of irritation, and, as you know, the parts that are chiefly affected by the acarus are the thin portions of the skin between the fingers. In infants you should always look at the feet, because they are generally affected, as children play with their feet a good deal. Apart from the localisation to the hands and wrists, the other regions of the body may be reflexly irritated and lead to scratch-marks, pustules, and urticarial lesions. Now in the diagnosis you may find in cleanly people that the hands are scarcely affected at all. In fact, you may find nothing about the patient's hands and yet he may be suffering from itch. This fact is often overlooked, many cases of itch being treated for something else and put through all sorts of irritating treatment without the slightest suspicion of its real nature, because nothing is found about the hands. Whenever you have an adult before you always ask the patient's occupation. In bricklayers and plasterers, and men who handle lime and similar substances, or laundresses who use soda, you may find no symptom whatever about the hands, but you must not be misled by that. Always examine your patient as thoroughly as possible. In the case of women, especially in private, it is difficult to do this, but you may lead them up to taking their things off as much as possible for you to see what there is to be seen. It is a mistake to trust to the statements of patients, which are often of a misleading character. In males you should always look at the penis, where you will frequently find one or two pustules. It is an important diagnostic feature of itch. I remember seeing, at the St. Louis Hospital, in Paris, a man with twelve hard sores about the penis simply from the fact that he was suffering from scabies. The syphilis had found its way into twelve open doors simultaneously and produced twelve chancres. I mention this case as it may perhaps impress upon you the importance of examining the genitalia in the male. If you are suspicious of itch in women always try to get a look at the breasts, where you may find pustules when there may be none or few in other parts of the body. After inquiring about the duration of the disease, which should be the first question, the answer enabling you to exclude so many conditions, always ascertain the distribution. In the case of women, wherever they can reach with their hands you will find scratch-marks, and women can reach practically all over their bodies with their hands. You will often find pustules about the buttocks in tailors and shoemakers, owing to their sedentary occupation. Another point in the diagnosis of scabies is to use a lens. If practitioners would use a watchmaker's lens and examine carefully between the fingers, the hypothenar and thenar eminences, and about the wrists, they would often be able to clinch the diagnosis, and avoid errors by finding a burrow. When the burrow is found you should attentively examine its terminal ends, and at the recent end you will find a small point, and will often be able to actually see the acarus with the lens. If you insert a needle on a holder at this point gently and scratch away the epidermis, the needle when withdrawn will have the acarus adhering to it. In children there may be a very large amount of pustulation, but that must not lead you to regard the condition as simple impetigo contagiosa, or even syphilis, which I have known occur. If you see irregularly scattered pustules about the hands and wrists, and about the feet and a little way up the ankles, you may be pretty sure you have to deal with scabies. In cleanly people following certain occupations you may be unable to find the acarus, and then you have to make the diagnosis on all the facts of the case; do not be satisfied with one symptom, but if you take all the symptoms together you will be right in nine cases out of ten, even though there is no burrow.

With regard to the treatment of scabies in infants it is very important to give minute directions to the parents or friends. Even when treating adults it is wonderful how minute one has to be with regard to the instructions; otherwise very peculiar mistakes are made and the parents are only too ready to blame the practitioner for the lack of success in the treatment. You cannot very well order sulphur ointment for children, because it is too strong, but you can use an ointment made up of Naphthol β ʒss, Prepared Chalk ʒss, to Lard ʒj, and tell the mother to give the child a soap and water bath at

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night and use a brush to open up the burrows; a tooth or soft nail brush will do very well. Having broken up the burrows, the ointment should be rubbed in the parts affected, leaving it on all night, and giving the child a warm bath in the morning. If that is done for three successive nights thoroughly, the condition will be cured. But the burrows must be opened, or the ointment will not get to the parasite. In adults that answers very well in private practice. You cannot always command a bath, but where that is possible, order three warm sulphide of potassium baths (℥ij to thirty gallons of water); of course the burrows must be opened with a brush. There is, however, one important point, namely, that the bath must be a porcelain one; if it is a metal bath it will be spoilt by the sulphide of potassium. Another important point is that you must either have the clothes baked or boiled in the copper. Old gloves must be thrown away, because they are a fruitful source of re-infection. I remember a case of a mother and child who both had scabies; they were treated and cured, but a few months afterwards they came again, and it was found that they had been wearing the same gloves they had worn during the previous attack. Of course there are other methods of treatment than those I have mentioned. In Poor-Law infirmaries they use Quick-lime ℥j, Sulphur ℥v, to water Oj. The mixture is stirred up and thoroughly filtered, made up to the twenty ounces again, and then with a stiff brush is well rubbed into the parts after a soap and water bath. At the St. Louis Hospital, in Paris, the patients are treated and, in most cases, cured, at one sitting, by means of soft soap, warm bath, and sulphur ointment. This rapid method is useful when many patients have to dealt with.

Another important point is not to go on treating a patient indefinitely for scabies because he still itches. The irritation does not subside at once, and the skin requires soothing, say with Lotio Calaminæ.

For a long time scabies was not suspected to be a parasitic disease at all, and it was treated as a disease of the blood—and still is sometimes, —namely, by strengthening medicines and tonics. But Renucci definitely showed scabies was a parasitic disease, although other observers had previously discovered the acarus. An interesting historical fact is that Napoleon I himself suffered from scabies, and his doctors could not cure him, but rather aggravated his condition, trying to get his blood into order. They quite overlooked the acarus. Scabies is a striking instance of rational treatment arising from the knowledge of cause.

We will now say a few words about pediculosis. I may introduce the subject by saying that for a long time the phthiriasis of the Greeks was supposed to be a horrible disease in which a multitude of pediculi were engendered by the patient, which eventually killed him. That was on the authority of Aristotle. He knew the pediculus and the nits; but he said that the nits were sterile, that they produced nothing, and that the pediculi were therefore spontaneously generated. The history of pediculosis is a very striking and interesting one, and is one of those things which medical men ought to know something about. On the authority of Aristotle every body believed for centuries in the spontaneous generation of pediculi, and many people thought that they bred lice. Not very long ago it was commonly supposed that there were lice bags in the skin, from which the lice issued forth and committed all sorts of ravages. But when exact methods came into vogue, Redi, who exploded the spontaneous generation theory with regard to flies, questioned this Aristotelian dictum, and after him Swammerdam and van Leeuwenhoek, two acute Dutch observers, pointed out that the pediculi were produced in the usual way, namely, from ova or nits. Notwithstanding these discoveries, there were many in the medical profession who went on denying the natural generation of pediculi. The human mind does go on in that way, and it is sometimes years before erroneous views collapse, and come to be honoured by the vulgar only. It is a warning to men not to be misled by authority, however great, and not to bow down too much to it, but to think and observe for themselves. With regard to pediculosis no one believes in the phthiriasis of the Greeks. In Plutarch's life of Sylla the Dictator you will find a description of this disease, phthiriasis. Many historical personages are supposed to have died of this fearful complaint. It is an important matter to know how the parasite feeds on the body. Many writers, such as Kaposi, Schmarda, etc., maintain that the pediculus

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bites the skin first and then sucks up the blood. It was shown by Leeuwenhoek years ago that the pediculus does not bite, but sucks the blood by means of a haustellum. You will be able to see the small nipple-like projection on the head of the pediculus, the *Pediculus vestimentorum.* In feeding this is protruded in the form of a long tube, at the end of which there are four minute threads, and by the approximation of these four minute threads the animal parasite pierces a blood-vessel below the epidermis. If you can catch a pediculus immediately after a meal you will see the blood rushing about in a turbulent way in the actively twisting gut. Leuwenhoek, who also observed this, pointed out that if the animal did not keep the blood in constant motion it would become coagulated, an occurrence which would be bad for the animal. It may appear trivial to you, but the question, "Does a louse bite?" is one which has cropped up, and medical men have been at a loss for an answer, because they were not sure as to whether lice bit their victim or merely inserted a sucker. Pediculi are insects, and have six legs armed with hooks. I show you some under the microscope. The *Pediculus capitis* has a triangular head, whereas in the *Pediculus vestimentorum* it is rather oval. The *Pediculus* or *Phthirius pubis* has two prominent eyes behind the antennæ and a crab-like body. The thorax is not differentiated from the abdominal segments as in the other two kinds. In all of them the male pediculus is smaller than the female. The female *Pediculus vestimentorum* has a notched posterior end, which contains the genito-anal orifices, the vagina being placed there. The male has its penis on the back, so that in copulation the female has to get on to the male. With regard to the crab-louse, the first pair of legs is armed with rather small hooks, but on the two posterior ones they are very formidable, and by means of these it anchors itself to the hairs of the pubes. I will now go through the various kinds of pediculosis. Pediculosis when mentioned without any qualification is taken to mean pediculosis of the body, that is to say, pediculosis corporis or vestimentorum.

As to pediculosis capitis, the diagnosis is comparatively easy. The child I show you here is said to have pediculosis capitis and impetigo contagiosa. In a case of this sort, where you get the hair matted together in the occipital region in a child, with the crusted lesions of impetigo contagiosa, ten to one it is suffering from pediculi. This is not an eczema, it is the result of scratching, due to the irritation. This leads to excoriations, and the *staphylococci* are planted out and produce the impetigo contagiosa. In some cases the child may be covered with impetigo contagiosa all over the face and down the neck. In the case before us you will notice the glands at the back of the head and neck are very much enlarged. The mothers say the glands enlarge first and then the pediculi appear later on, mistaking effect for cause. In examining a case of this kind you must look for the nits, with a lens if necessary. In adults the disease chiefly affects women, because their hair is longer, and therefore the pediculus has a better chance of keeping out of sight and breeding undisturbed. That is a point which Aristotle himself observed; for in his chapter on the generation of pediculi he mentions that it affects women more than men. With regard to adults, of course, if they come to you with itching at the back of the head you must always examine for nits, and must not be put off the scent by the respectability or otherwise of the patient, because the disease, like syphilis, occurs where least expected. The nit is attached by a cement substance to the hair and it has an operculum or lid. I hand round some attached to hairs. When the pediculi are very abundant the nits are numerous, and many attached to a single hair, as in the specimens you are looking at. The lowest one usually hatches out first. You can diagnose nits from epidermic scales by the fact that the latter can be brushed off, but the nit is firmly attached. Of course you may in bad cases see the actual pediculi.

With regard to treatment, it is really very simple, and, except in children, there is no necessity to cut off the hair. A very good way is to use 1 in 40 carbolic lotion, and take strands of hair in one hand, and with the other wipe them over with a cloth soaked in that solution. Acetic acid or vinegar will do the same thing. The back of the head is then smeared with Ammoniated Mercury gr. x, Olive Oil ℥x, Lard ʒj. The greasy application blocks up the parasites' tracheæ and so kills them.

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The treatment of impetigo contagiosa in connection with pediculosis capitis is not at all an easy matter, unless proper directions are given. The crusts must always be softened with oil or warm water, and then *picked off* before applying the ointment. Another useful thing is ordinary petroleum lamp oil, but I need hardly say that if this is used you must take care that the patient must not be near a fire. I was told of one very serious case from the neglect of this precaution, the patient being very severely burnt. It may be applied by getting the patient to sit on a stool near a table, upon which the hair is spread out and the paraffin oil applied. In children the quickest method is to cut the hair off and get rid of the nits. If you do that thoroughly and use the remedies properly you can be sure of curing the case rapidly. Sometimes the glands in the back of the neck may suppurate, and if they do the pus in them must be let out. It is the irritation of the pediculi and the suppuration going on in the scalp which leads to their enlargement. Warm water should be applied to them to diminish them. I may say it is sometimes difficult to convince some people that there are pediculi in the head.

With regard to pediculosis corporis or vestimentorum, that is a condition which leads to great irritation of the body. Note the disturbed sleep of the tramp. This is a striking feature in pediculosis corporis; the parasite leads to so much irritation that even when the patients are asleep you can see the reflex shivery movements.

In this condition again you are helped in the diagnosis by the distribution of the scratch-marks about the parts which the patient can reach, especially the shoulders and upper part of the back. In very bad cases the irritation spreads to the whole of the body. That is so much so in chronic cases that tramps eventually get a pigmentation of the body, which is in some cases very intense. If you go to the Poor-Law infirmaries, the medical officer will generally be able to show you such cases, and you will notice the pigmentation and superficial scarring on the bodies of these people. This condition is also interesting because it is sometimes mistaken for Addison's disease. French observers have said that the pigmentation may affect the mucous membranes, and that therefore the pigmentation is not due to the scratching. In some of these cases of so-called Vagabond's disease, as they were designated by Greenhow, the ecthymatous and impetiginous inoculations over the body have given rise to the suspicion in some minds that the condition was syphilis. Of course in the cases of pediculosis the age of the patient is a very important matter, because pediculosis corporis usually affects the old and cachectic. A man who has, perhaps, come down in the world, will go into a common lodging-house and will there probably acquire pediculosis vestimentorum. You must get the patient to undress and then look inside the neck-band of the underclothing with a lens, and you will then be pretty sure to find the pediculi. Sometimes they want a little hunting for, on account of their colour, which helps them to escape detection.

As a rule the diagnosis is very simple, but it is astonishing how many cases of scabies and pediculosis corporis are overlooked simply from want of careful examination.

With regard to the treatment of pediculosis vestimentorum, the great thing is to treat the clothes. Of course the pediculi inhabit the clothes, and if these are not baked or thoroughly boiled in a copper the patient will not be much better off. It has been pointed by Dr. Jamieson, of Edinburgh, that the nits are found on the short hairs of the body. This explains the obstinacy of some cases, and if you do not treat the body as well as the clothes you do not destroy the nits, and a fresh lot of insects escape from the ova. A warm carbolic acid bath, ʒss, to thirty gallons of water, of a quarter of an hour's duration, is useful for recurrent cases.

With regard to treatment, in the matter of prescriptions Unguentum Staphisagriæ is one of the best things, the patient being ordered to rub it in about the neck band; that obstructs the tracheæ of the insects, in fact asphyxiates them. In the treatment of these cases you have also to deal with an irritability of the skin, which becomes really a neurosis. To allay this it is always good to order half a dozen warm alkaline baths, viz. a couple of ounces of bicarbonate of soda to thirty gallons of water.

The differential diagnosis sometimes presents some difficulties, as patients may come to you with a clean change of underclothing, and you

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do not find the pediculus. In such cases you must be guided by the age of the patient and by the distribution of the scratch-marks; and it is very seldom you can go wrong if you take these points into consideration.

Now with regard to another condition which is sometimes met with in old people, the pruritus senilis. In old people the skin undergoes degenerative changes, and these may lead to a most troublesome pruritic condition, which you must not mistake for pediculosis. In cases of pruritus senilis there is very little to be seen, although the subjective sensation of pruritus is marked. A patient may come to you with urticaria, which leads to very great irritation. The urticaria may be dependent on the presence of pediculi, or it may be dependent on scabies. Therefore do not diagnose a case as one of urticaria only without first excluding the animal parasitic diseases. In some cases there is albuminuria or sugar in the urine, which may lead to pruritus and urticaria. The examination of the urine should never be omitted. Of course there are all sorts of toxic things which lead to urticaria, such as shell-fish and so on. If people come to you with itching, you must not run away with the idea that it is pediculosis; it may not be anything of the sort. You must take every case on its merits, and make a diagnosis on all the facts.

Now let us devote a few words to pediculosis pubis. That is a condition which is rarely met with. There are no cases for you to see to-day, as it is very rare in hospital practice, though in private practice it is more common. Young men contract it chiefly from impure sexual connection, but it may be contracted in an innocent manner, and you must not always pooh-pooh the statements of the patients in this respect. There is in this disease great irritation about the pubic region, and consequently many scratch-marks. Sometimes the patients come to you after they have used ointments, and there may be a very bad dermatitis in the pubic region, but the patient will not say a word to you about the pediculi, complaining only of the weeping, inflamed skin. Perhaps you may be able to get from the patient the fact that he has had 'crabs.'

With regard to the diagnosis, there are what are called maculæ cœruleæ, little finger-nail sized bluish discolorations about the pubic region, which are really due to a poison inserted by the crab-louse into the skin. Duguet, a French observer, has found that the poison is contained in two glands opposite the second pair of legs.

With regard to treatment, that is very easily carried out, but there is one thing I do not believe in for it, and that is Unguentum Hydrargyri. I have seen it produce most severe dermatitis. It is not necessary to order such a strong ointment; equal parts of balsam of Peru and lard will do all you want. The creatures are killed by preventing respiration, by the fatty application blocking up the tracheæ. Eau de Cologne is sometimes effectual. For the nits you can use acetic acid, or vinegar, or 1 in 40 carbolic lotion. Some skins are very sensitive to mercurial applications, and you may not only get a bad dermatitis with Ung. Hydrarg., but if the patient is susceptible you may produce salivation and stomatitis.

I should now like to refer to those cases which may be called pediculosis cerebri, that is to say, cases of people who come to you with itching, and nothing will make them believe that they have not got lice. Some of these patients are very troublesome to deal with. They will say they feel the parasites crawling about. In them it may become a stereotyped delusion, and such cases find their way into asylums. In other cases where lice have been present, you may cure their pediculosis, but they will nevertheless come back and say that they still feel insects about them. At other times these patients suffer from ideas of persecution, and have auditory hallucinations. I remember one man who said that people called him lousy wherever he went. He was quite persecuted by these ideas. Such a case is serious. The prognosis is bad where there are auditory hallucinations. In those cases you must overhaul the patient and endeavour to set his mind at rest. At any rate it is your duty to do all you can to set the patient's mind at rest by satisfying him that he has not got parasites. I remember a case of pediculosis pubis in an old man, whom I treated, and he not only had pediculi in the pubic region, but also about the hairs of the abdomen and chest, in his beard and axillæ, and on the shins. After he got well I had great difficulty in making him believe that he was rid

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of them; he kept bringing all sorts of little bits of dirt and wool, carefully wrapped up in paper, and swearing that they were pediculi. Of course cases like that are rather serious from a mental point of view.

With regard to other animal parasitic diseases, I may say a word or two about the chief ones.

Scratching and irritation of the skin may arise from animal scabies (dogs). In these cases the parasite does not thrive on the human body, but it gives rise to irritation, and you must be on the look-out for it. People come with a scratched skin and papules about the body, but the lesions are much less severe than in human scabies. The disease may sometimes be traced to a pet dog.

There is another complaint which we do not see often, namely, that caused by *Demodex folliculorum* about the nose. In some cases you can squeeze the parasite out. It has eight legs and a worm-like body, showing much more degeneration from the spider-like ancestor. That condition is not important.

Another interesting acarus is the *Leptus autumnalis*, or harvest bug, which leads to great irritation, especially about the legs. Women and girls walking through the fields may get troubled by the six-legged young of this parasite. The lesions may be very markedly pustular and crusted. A severe case I once saw impressed me, namely, that of a girl who came with ecthymatous sores about the legs, the ulceration being rather marked. It might have led to a suspicion of syphilis. But there was no corroborative evidence of syphilis; she had been out in the fields in the autumn and had evidently received the attentions of this parasite, which had produced a great deal of irritation.

Then there is the *Filaria medinensis*, or fiery serpent of the Hebrews. This is an Eastern disease. This filaria has for its intermediate host a fresh-water Crustacean, and it finds its way into the human body through the drinking water, a point to be borne in mind.

Another disease found among the negroes of West Africa is craw-craw, also due to a filaria.

There is another animal parasitic disease of the skin which it is worth while referring to, viz. cysticercus cellulosæ cutis. The cysticerci of *Tænia solium* become subcutaneous and form numerous small elastic tumours scattered about the surface of the body. It is a very rare condition in this country, but cases crop up occasionally. If the elastic tumours are incised, the hooklets in the fluid would clear up the diagnosis. Should any of you come across such a case I should very much like to see it.

THE BLOOD-CORPUSCLES IN HEALTH AND DISEASE.

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(*Concluded from p.* 136.)

THE next matter I wish to allude to is the problem of the *origin of the white corpuscles*, from what tissue or tissues are they derived, and what relation do the several forms of corpuscle bear one to another. At the outset I may remark, that the weight of recent authority is against the view that young corpuscles arise in health by the division of cells already in circulation. Division forms are but rarely seen in blood preparations, and then only under circumstances of disease.

We have next to determine whether the corpuscles enter the blood-stream in a fully developed and mature state, or whether they undergo further development after they have entered on the intra-vascular phase of their existence. The answer to this may be sought in a close examination of the blood itself. If, on the one hand, corpuscles do develop whilst in circulation, then it should be an easy matter to discover transition forms in the blood, indicative of their growth An absence of such transition forms, on the other hand, may be taken as evidence that the corpuscle, after entering the blood, undergoes no further change. The result of investigation directed to this point is to show that certain of the blood-elements stand, as it were, isolated, always presenting the same structural features, and never connected by intermediate forms with other varieties. Examples of this are the polymorphonuclear cell, the coarsely granular cell, and the cell containing basophile granules. In regard to the group of non-granular cells, however, a different state of things is found. The blood contains not only *lymphocytes* and *large*

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hyaline cells, but also *intermediate forms*. The only essential difference between the lymphocyte and the large hyaline cell is that in the one the protoplasm around the nucleus is scanty, while in the other it is abundant; and even in this respect no hard and fast line can be drawn between the two, since cells are found, and commonly found in the blood, in which every degree of thickness of the protoplasmic margin is seen, or, in other words, in which every stage of the growth of the lymphocyte into the large hyaline cell is illustrated. The size ultimately attained by the hyaline cells in the blood-stream is not uniform; only a few grow to the largest size while within the blood-vessels, and hence the fact that the group of blood-cells arbitrarily defined as that of the "large hyaline cells" is a small one, amounting only to about 2 per cent. of the total number of white blood-corpuscles.*

Lymphocytes, then, while in circulation, grow into larger hyaline cells. What is the origin of the lymphocyte? The question is best answered by examining a section of a lymphatic gland. One of the few indisputable and enlightening facts bearing on the origin of the blood-cells is the close similarity of the lymphocytes in the blood to the small round cells with which the lymphatic glands abound. The two cells are, indeed, indistinguishable, and it is impossible to doubt that lymphoid tissue (including under this term not only the lymphatic glands, but also patches of tissue situated elsewhere in the body, and particularly in the course of the alimentary canal), is the nursery in which the lymphocytes originate by cell-division, and from which they are launched, while yet immature, on their travels by way of the lymph-channels to the blood-stream. Correlated with this is the clinical observation that, in the form of leukæmia known as lymphatic leukæmia, which is characterised by an enormous increase in the number of lymphocytes in the blood, evidence of a diseased state of the lymphatic glands is to be found in their enlargement.

The origin of the three kinds of granule-containing corpuscles is by no means so clear. Taking, in the first place, the case of the polymorphonuclear cell, I have already pointed out that in healthy blood this cell is present only in its fully developed or adult form. When, however, under pathological influences, the number of these cells is greatly increased, as, for example, in myelogenic leukæmia, immature forms may appear in the blood, which are obviously young individuals of the polymorphonuclear group. These immature forms consist of cells which, in size, and in the character of their protoplasm, resemble the adult corpuscle, while their nuclei exhibit various stages of transition from a simple rounded body to the elaborately elongated, coiled, and constricted nucleus that is so characteristic of the adult cell (Fig. 5). The inference is clear that in the early stages of its growth, the polymorphonuclear cell exists as a simple body, of which the nucleus is rounded; and that, whereas in health the metamorphosis of the simple into the more complex form is completed before the corpuscle enters the blood, in diseases that are associated with great proliferation of these cells, young forms, whose growth is not yet complete, may leave their birthplace, and make a way into the blood.

We are left, however, as much in the dark as before in regard to the tissue from which these precursors of the polymorphonuclear cell are derived. Certain tissues may be at once excluded on histological grounds. No cells resembling either the young or adult forms of the polymorphonuclear corpuscle are present in the lymphatic glands, nor are there normally any to be found in the lymph that bathes the various serous membranes. It is not, then, to the lymphatic system that we must look for their origin. Again, with regard to the spleen, it is recognised on all sides that, though concerned with the destruction, it takes no part in the formation of blood-corpuscles. There remains the view—and much may be said in its favour— that the *bone-marrow* is the tissue to which the polymorphonuclear cells owe their origin, in which they are stored, and from which they issue in their adult form. Ehrlich,* who first propounded this view, in support

* I ought here to say that there is evidence showing that a certain number of the lymphocytes do not follow the lines of development traced above, but after passing through transition-stages grow into the large oval cells with bulky elongated nuclei, to which I have already referred.

* See 'Histology of the Blood,' by Ehrlich and Lazarus;' translated by Myers, p. 105.

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of which further evidence is to be found in the researches of French observers, has satisfied himself of the existence in marrow of (1) fixed cells containing granular protoplasm and rounded nuclei; (2) cells indistinguishable from the polymorphonuclear blood-corpuscle, containing granular protoplasm and characteristically contorted nuclei; (3) transition forms representing every intermediate stage between the two first-mentioned cells. He maintains also in respect of the cell-granules that he has demonstrated the identity of the granules in the marrow-cells with the granules in the polymorphonuclear cells, principally by virtue of their colour-reaction with certain specific combinations of stains. On these grounds he bases his theory that the finely granular cells of the bone-marrow are the parent-cells of the polymorphonuclear corpuscles, and that the marrow, and the marrow alone, is the tissue whence these corpuscles are derived. He finds further support for his view in the fact that under pathological conditions in which the bone-marrow is diseased, as in myelogenic leukæmia, there are found in the blood "myelocytes," cells with rounded nucleus and finely granular protoplasm, which he considers to be primitive forms of the polymorphonuclear corpuscle.

Attractive as this theory is as a whole, it is open to objection in certain details; and I would offer the criticism that in the blood of myelogenic leukæmia, the uninucleated cells which are obviously the precursors of the polymorphonuclear cells, being connected with them by intermediate forms, are by no means identical in appearance with the myelocytes, with which they may be seen side by side in the blood. But although the arguments brought forward by Ehrlich may not be in every respect convincing, it must be admitted that there is a good deal in favour of his view, stated generally, that the polymorphonuclear cells are derived from the bone-marrow; and notwithstanding the fact that its proof cannot, for the present, be regarded as complete, we may look upon this as a likely theory.

As regards the origin of the coarsely granular eosinophile cells and the finely granular basophile cells, there is, unfortunately, not much to be said. The view that the coarsely granular cell represents a further development of the polymorphonuclear cell is not a likely one; the entire absence of transition forms between the two is strongly opposed to it. It is interesting to notice in this connection the curious distribution in the body of the coarsely granular cells. Although so few and far between in the blood, where they seldom amount to more than 2 per cent. of the white corpuscles, they are present in abundance in the fluid of the serous sacs, the pericardial and peritoneal cavities, where no polymorphonuclear cells are normally to be found; and they may be said to belong more properly to the lymph that circulates extra-vascularly than to the blood itself. Large cells containing eosinophile granules are present in the bone marrow; and on this ground Ehrlich is inclined to assign to the marrow the further responsibility of making provision for the coarsely granular cells. But the special disposition of these corpuscles in the serous sacs is not in favour of this view; and still more difficult is it to reconcile with the fact that eosinophile cells abound in the blood of the

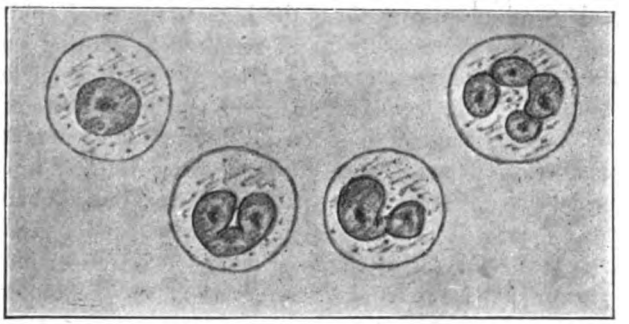

FIG. 5.—Early stages of the polymorphonuclear cell.

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ray, one of the cartilaginous fishes which possesses neither bones nor bone-marrow.

I have already given too much time to this interesting matter of the origin of the white corpuscles; and I may summarise our knowledge on the subject by saying that the *lymphocytes* are doubtless derived from lymphatic tissue, and that in the course of their growth they develop into the larger members of the group of hyaline cells; that the *polymorphonuclear cells* have an independent origin, which there is reason to believe may be located in the bone-marrow; and that as regards the origin of the *coarsely granular cells* and the *cells containing fine basophile granules*, we are at present in the dark.

Closely related to the matter I have been discussing is the subject of *Leucocytosis*, to which I would now ask your attention. Leucocytosis is that state of the blood in which the number of white corpuscles is notably raised above the normal standard. It is not usually the case that the different kinds of white corpuscle are all or equally involved in the leucocytic process. The increase may, in fact, fall on one kind of corpuscle and on that alone, the numbers of the others being practically unchanged. Or all the corpuscles may share in the leucocytosis, though probably not in an equal degree. Or, lastly, the total number of leucocytes may be swelled by the addition of forms, such as myelocytes or the so-called large lymphocytes, that are foreign to the normal blood. We are thus provided with a convenient basis for distinguishing three kinds of leucocytosis—(1) a simple leucocytosis, in which there is a large preponderance of one kind of cell; (2) a mixed leucocytosis, in which more than one kind of cell is involved, all the cells, however, being of normal type; (3) a form of mixed leucocytosis in which there are included among the leucocytes cells of an abnormal type. Of the first group a good example is found in the polymorphonuclear leucocytosis that accompanies most acute infective processes, and this is the form to which I would now allude. An increase in the number of the polymorphonuclear cells in circulation occurs in nearly all the acute infective inflammations, in the specific fevers, in suppurative processes, and in septic conditions. There are a few curious exceptions to this general rule. In *typhoid fever* the number of the polymorphonuclear cells is not increased, but on the contrary, may be diminished. The same has been noticed of *influenza*, *measles*, and uncomplicated *tubercular disease*. Until quite recently malarial fever was included in this category, but lately it has been shown that leucocytosis occurs in this disease, though only to a slight degree.

The presence or absence of leucocytosis may be of considerable value from the clinical point of view, for the purpose both of diagnosis and prognosis. For instance, in a doubtful case in which typhoid fever is suspected, most other forms of acute infective disease may be excluded if the blood is examined, and leucocytosis is found to be absent. Again, a case is known to be one of typhoid fever, and it is thought that some infective process of a secondary nature may have arisen. The demonstration of leucocytosis would in such circumstances be positive evidence of the highest value. Rapid increase in the degree of an already existing leucocytosis is an event which should not be lightly passed over, for it is often significant of the onset of suppuration in a previously non-suppurative inflammation. This has been demonstrated in the case of appendicitis, and it is a rule that probably holds good for other inflammatory conditions. Again, in arriving at a prognosis in a case of infective disease, valuable information may be obtained by an examination of the blood. For the appearance in large numbers of polymorphonuclear cells in the blood should not properly be regarded as a symptom of the disease, but rather as evidence of a reaction on the part of the individual which tends to health. The degree of leucocytosis is, in fact, to some extent, a measure of the resisting power. Taking acute lobar pneumonia as an example, cases that progress favourably always show a well-marked leucocytosis, which increases up to the time of crisis, when it is arrested and followed by a diminution in the number of polymorphonuclear corpuscles until, during convalescence, this may fall below the normal. If, on the other hand, during the acute phase of the disease, leucocytosis is ill-developed, or not developed at all, it is a sign either that the attack is of a specially virulent character, or that the resisting power of the patient is small; and the outlook in either event is modified accordingly.

An explanation of the occurrence of leuco-

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cytosis in infective disease may be sought for in the theories which are concerned with the obscure influences known as *chemiotactic*. It is supposed that the invading micro-organisms secrete substances which circulate in the blood-stream and ultimately come in contact with the tissues that are concerned with the formation of the polymorphonuclear corpuscles. Here they have the effect of a great stimulus to cell-production, and lead to the formation of the polymorphonuclear elements in large numbers, and their launching into the blood-stream. The substances secreted by the micro-organisms have, further, an *attractive* influence on the newly-formed blood-corpuscles, by virtue of which the latter are drawn to the vicinity of the micro-organisms, and become aggregated at the site of infection. In the conflict that ensues between the micro-organisms and the blood-cells, the issue naturally depends on the relative strength of the opposing forces. In this conflict the sole weapon of the micro-organisms is a chemical one, consisting of the poisonous bodies or "toxins" which they secrete, and which by their presence are inimical to the health and life of the blood-cells, and more remotely, if this line of resistance be overcome, to the health and life of the individual. The defending forces, on the other hand, consisting chiefly of the polymorphonuclear blood-cells, possess a double weapon. In the first place they can meet the poisons secreted by the micro-organisms by counter-poisons, or "antitoxins;" and, in the second place, by virtue of their powers of amœboid movement, they can make short work of the micro-organisms that come within their reach, including them in their substance, digesting them, and turning them to their own ends. In other words, the corpuscles both offer a direct resistance to the micro-organisms by means of *phagocytosis*, and also display an *extra-cellular activity* in the elaboration and secretion of antitoxins.

In the event of great virulence on the part of the micro-organisms, it would appear that the substances they secrete may exert, not an attractive, but a repellant influence on the white corpuscles (the so-called "negative chemiotaxis"); and, further, that in the presence of virulent toxins, the functional activity of the tissue whence the polymorphonuclear cells are derived may be not stimulated, but depressed. The consequences to the individual, unprotected by leucocytosis, are likely to be disastrous. Supposing the theory to be correct, that the bone-marrow is the source of the polymorphonuclear cells, it becomes obvious how important a function this tissue subserves; for it is the centre on which we chiefly depend for our defence against the hosts of micro-organisms by which our welfare is daily being threatened.

It should be mentioned here, that although in infective forms of inflammation the leucocytosis is of a simple order, involving only one kind of cell, Sherrington has shown that in non-bacterial inflammation a mixed leucocytosis is produced in which both the polymorphonuclear cells and the group of hyaline cells are concerned.

The leucocytosis that follows a sudden and severe loss of blood is of interest chiefly from the fact that it may appear very rapidly, within an hour or so of the hæmorrhage. It can hardly be supposed that in so short a time any great cell-multiplication has taken place; and the probability is that there exist normally large stores of corpuscles, held, as it were, in reserve, and available for the rapid replenishment of the blood when required.

There is no time for more than a brief allusion to the remarkable forms of leucocytosis in which the coarsely granular or eosinophile cells are the ones chiefly affected. The principal conditions in which an *eosinophile leucocytosis* has been observed are:—(1) Asthma; (2) Pemphigus, and other skin diseases; (3) in the subjects of intestinal worms.* The *asthma* is usually of the bronchial variety; and not only are the coarsely granular cells found in large numbers in the blood, but also they abound in the sputum. Cases of *pemphigus* are recorded in which the number of coarsely granular cells has been increased, roughly, to twenty times the normal; while the fluid contents of the characteristic bullæ of pemphigus have been shown to contain almost exclusively cells of an eosinophile character. Other forms of skin disease, notably psoriasis and urticaria, may be associated with an increase in the coarsely granular blood-cells; and all I would say about these is that the leucocytosis

* v. Ehrlich and Lazarus, *op. cit.*, p. 150.

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appears to depend more on the superficial extent of the cutaneous affection, than on its nature or severity. The curious association of eosinophile leucocytosis with *intestinal worms* has been noted by competent observers in the case of all the common varieties, including threadworms, roundworms, and tapeworms; but never in such degree as in connection with the *Ankylostomum duodenale*, a worm which is prevalent in Egypt, and probably the cause of the so-called Egyptian chlorosis. Ehrlich alludes to a case of ankylostomiasis in which the blood contained eosinophile cells amounting to 72 per cent. of the total number of white corpuscles.

In conclusion, I would make a brief reference to the leucocytosis that, as a symptom, is common to the various diseases grouped under the name of *Leukæmia*. Putting on one side the rarer forms, there are two main types of leukæmia:—*Lymphatic Leukæmia*, in which there is reason for believing that the blood-state is dependent on a disordered condition of the lymphoid tissue throughout the body; *Myelogenic Leukæmia*, in which the character of the predominant blood-cells is such as to suggest that their origin is in the bone-marrow. The name of "Splenic Leukæmia" is sometimes given to the latter disease, and it is at least descriptive of a prominent anatomical feature of the disorder, in which the spleen may attain an enormous size. The epithet "myelogenic" is, however, more appropriate, as it serves to emphasise the close connection which undoubtedly subsists between the peculiar blood-state and the bone-marrow, whose structure is always found after death to deviate considerably from the normal. The myelocytes that abound in the blood are, for the most part, of the finely granular variety, only a few individual cells containing coarse granules. In addition to these abnormal elements there is a well-marked increase in the number of the normal white corpuscles, in which all the varieties are involved, though often the basophile cells out of proportion to the others. Among the blood-cells are found atypical forms, some of which, as I have pointed out, are of great interest as illustrating stages in the development of the corpuscles, while others are evidently malformed individuals, and of no special interest. Evidence of cell-division may be seen in the form of karyokinetic figures, and nucleated red corpuscles are nearly always present, sometimes in considerable numbers.

In most cases of myelogenic leukæmia the lymphatic glands present no notable enlargement. In *Lymphatic Leukæmia*, on the other hand, there is not only a generalised enlargement of the lymphatic glands, but this is associated with an overgrowth of lymphoid tissue as wide-spread as is its normal distribution in the body. The spleen is usually involved; sometimes the liver, and the numerous follicles in the course of the alimentary tract share in the general lymphoid overgrowth. The blood-state may be characterised as a *lymphæmia*, its chief feature being an enormous preponderance of the small, rounded lymphocytes, combined with an increase to a lesser degree of the larger varieties of hyaline cells.

I have, in the last place, to thank you for the kind attention you have given to my address; and I would remind you that notwithstanding the large number of workers who have concerned themselves with the study of the blood-corpuscles, there remains a vast field unexplored, and doubtless rich with treasure; and that problems of a most varied and interesting nature await elucidation.

We have received a copy of 'Essentials of Practical Bacteriology' from Longmans, Green, and Co. The author of this book is Mr. Henry J. Curtis, and he tells us in the preface that he has had the great good fortune to be in charge of the Bacteriological Department at University College, London, under Professor Victor Horsley and Professor Sidney Martin. Generally speaking the course of study described in the work is such as is required for those working for the Diploma in Public Health. The author has struck the true note of scientific inquiry when he says that he has given in detail the methods adopted by Plimmer in his recently recorded brilliant investigations on cancer, so that this work may be repeated, the results confirmed, or, if need be, qualified. The repetition of a recorded experiment often leads to the most valuable discoveries, and the establishment of a single new fact in the ætiology of a disease may confer untold benefit upon suffering humanity. Mr. Curtis must be congratulated on his volume having already achieved success, for it has been accepted as a text-book by a number of medical schools.

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CLINICAL LECTURES

ON

VARIOUS FORMS OF INTRA-ABDOMINAL SUPPURATION.

Delivered at Westminster Hospital,

By A. H. TUBBY, M.S., F.R.C.S.,
Surgeon to the Hospital.

LECTURE VI.

On Pelvic Suppuration and Tubercular Peritonitis.

Gentlemen,—To-day I propose to speak of suppuration in the lower part of the pelvis; and last week, you will remember, we discussed the presence of pus in the upper portion of the abdomen in the form of subdiaphragmatic abscess.

Among the conditions which are met with in the pelvis are *cellulitis*, *peritonitis*, and *suppurating hæmatocele*. These subjects trench on gynæcological work; at the same time they are diseases which every surgeon should be able to diagnose, and any surgeon may be called upon to treat. The inflammatory state known as pelvic peritonitis is of two varieties, non-suppurative and suppurative. With regard to the non-suppurative, it does not come within the scope of these lectures. But as to the suppurative form I shall speak of that somewhat fully. One of the chief causes of purulent pelvic peritonitis met with is pyosalpinx, or a diseased condition of the uterine appendages, especially of the Fallopian tubes. There is, in the first place, inflammation of the tubes followed by occlusion and the formation of pus, whence inflammation of either the non-suppurative or suppurative variety spreads to the peritoneum, or pus may escape from the tube and infect the peritoneum directly. So there are in order a condition of salpingitis, pyosalpinx, and infection of the pelvic peritoneum. When pus appears, the walls of the abscess are formed by the neighbouring structures *i. e.* the pelvic viscera, the rectum, intestines, uterus, bladder, and by the adhesions which spring up between the peritoneum and the viscera. In the centre of such a cavity there is the diseased ovary or diseased tube. It is a fortunate circumstance that pus forming in this way so often remains localised in the pelvis; were it to spread it would give rise to a general peritonitis.

Another disease met with in the pelvis is pelvic cellulitis, otherwise known as parametritis, and it forms a very large proportion of the cases which are admitted under the care of the obstetric physicians into our wards. Pelvic cellulitis an inflammation and suppuration in the subperitoneal tissue around the viscera, especially the cervix uteri, vagina, and between the folds of the broad ligament. In order that you may understand how this pelvic cellulitis arises, you should remember that the lymphatics from the cervix uteri and the body of the uterus pass into the subperitoneal cellular tissue, and the septic emboli from the inflamed viscera become lodged in the neighbouring tissues and infect them, causing exudation, thickening, and pus in the cellular tissue. Cellulitis may be limited entirely to the pelvis, or it may spread along the subperitoneal tissue for a great distance. For instance some abscesses in the lumbar region are due to the septic condition of the uterus, or an abscess beneath the diaphragm occasionally originates in a septic condition of the cervix uteri. In order to understand how that happens, you may take a parallel case, namely, a wound of the hand with lymphangitis running up the hand and arm, and you will find there will be a place in the course of the lymphatics at which suppuration has broken out, and further on another focus of suppuration. This is what happens in the case of the wandering abscess arising from pelvic cellulitis. As the inflammation spreads through the lymphatics, the lymphatic glands in the pelvis and along the spine are involved, and they may break down and suppurate freely. As a rule the abscesses do not burst into the general peritoneal cavity, but in rare cases such an event has taken place, and then acute peritonitis has been produced.

There is no doubt that the most common cause of cellulitis is connected with delivery of a child, especially if it be followed by puerperal fever, and you may find both pelvic peritonitis and pelvic cellulitis co-existing. Should the cervix or the body of the uterus become infected with septic organisms there are produced multiple septic emboli, *i. e.* masses of septic organisms scattered through the uterus and its lymphatics

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and thence into all parts of the subperitoneal tissue. The course that the pus takes must depend very largely upon the position which the patient assumes, and also the position in which the abscess starts. If it begins in the pelvis between the layers of the broad ligament, and the patient lies recumbent, much of the pus gravitates towards the back of the pelvis, and will be found around the rectum. If it be not evacuated it works its way up behind the posterior parietal peritoneum and may be found around the kidney. Indeed the burrowing may be very extensive, and pelvic abscesses may point anywhere. If left alone they commonly burst at the posterior wall of the vagina, but they also point in the rectum or in the bladder. In not a small number of cases they have come forward through the cellular tissue in the iliac fossa and opened above Poupart's ligament, and in that case the amount of pus must be very considerable. These cases are of particular interest because of their great gravity; and they often baffle the surgeon. Suppuration lasts a very long time. The deaths which ensue are due to persistent pyrexia, or to exhaustion or general weakness with lardaceous disease from the long-continued discharge of pus. Therefore, suppurative pelvic cellulitis must always be a very formidable disease to treat. As it has been stated, the origin of pelvic cellulitis is frequently septic midwifery.

Another cause is the use of septic instruments when operating upon the cervix in the ordinary course of gynæcological practice; and yet another is the use of some pessary. There is a particularly evil form of pessary called the stem pessary, which is inserted into the uterine cavity, and it has been frequently known to give rise to serious pelvic cellulitis and peritonitis.

Localised pus in the pelvis is sometimes due to a suppurating pelvic hæmatocele. Blood is discharged either into the Fallopian tube or else bursts the Fallopian tube and discharges itself into the pouch of Douglas. In most cases this blood is absorbed. But occasionally it happens that instead of so doing it breaks down. So long as the blood is found between the layers of the broad ligament the affection is extra-peritoneal, and it is the extra-peritoneal collections which are likely to suppurate. If the blood is poured into the peritoneal cavity it is very rare for it to break down.

What are the symptoms of the purulent forms of pelvic peritonitis, cellulitis, and pelvic hæmatocele? There are certain general symptoms which are well marked, viz. the usual symptoms of pent-up pus. The temperature is that of fever, and it may rise to 105°, with rigors.

The local signs and symptoms are often very obscure, and they require skill to detect and differentiate between them. The most important local sign is elicited by digital examination, and it is necessary that one should examine both the vagina and the rectum. A bimanual examination should be made, because it is only by so doing that you can appreciate the fact that there is increased thickness of tissue around the uterus and in the floor of the pelvis.

The first point you notice is induration, especially in the floor of the pelvis and on the sides. Secondly, you will observe that in the case of pelvic cellulitis the thickening is generally one-sided, and in pelvic peritonitis it is generally symmetrical. The pouch of Douglas is unusually full, and the pelvic floor is pushed down. The uterus no longer occupies its normal position; it is displaced forwards, or backwards, or laterally, and when you attempt to move the uterus it is absolutely fixed, as if a mass of plaster of Paris had been poured into the pelvis. It is very important in these cases to make your examination under an anæsthetic, because the parts are very tender, and the patient is in a condition in which she is quite unable to bear any prolonged digital examination. If you find there is pus, it is better to evacuate it at once and not to submit her to a second anæsthetic.

With regard to the treatment, preventive and early, I must refer you to the works on gynæcology. From the surgeon's point of view it is well to note that signs of intestinal obstruction occur frequently in the course of a case, for in pelvic peritonitis the intestines are matted and fixed, and sometimes kinked. When you operate for the evacuation of pus you have to consider two points: first of all, the condition of the patient. Can she bear a prolonged operation? Then, from what point can the pus most easily be evacuated? The condition of the patient is often a very serious one and, owing to the fact that

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there is considerable pyrexia, the patient is very weak and unable to bear a prolonged operation. It is very inadvisable in these cases to attempt to remove the uterine appendages, or to do anything more than evacuate the pus—which should be done as quickly as possible—and put the patient back to bed. You should make up your mind which is the most accessible point from which the pus can be reached and cleared out. In coming to a decision on that point you must give weight to the position which the patient is likely to lie in after the operation. For instance, if there is pus low down in the pelvis it will perhaps be very unwise to attempt to drain such an abscess through the anterior abdominal wall, because that position is against proper draining. You should open such an abscess low down in the pelvis through the posterior vaginal wall. In order to reach pus which is situated deep down in the pelvis by an anterior abdominal incision, it follows that you must somewhere go through the healthy peritoneum, and if you do that you run the risk of infecting it. I know some surgeons advocate this line, but I am inclined to think it is adding further risk where such should not be taken. On the other hand, if you are not sure where the pus can best be reached, the rule you follow is to make the usual median incision below the umbilicus and search carefully; for the central position is the most useful. If you open the abscess by passing through the general peritoneal cavity, you will find that the wall of the abscess is bounded by adherent intestine, and you must evacuate the pus without injuring it. Therefore the rule is to search for the pus with an aspirating needle at a spot on the abscess wall where there is no intestine attached; after having found it, you push the aspirating needle in and evacuate the pus. Of course, as you do so, it is a matter of the most vital importance that you should not allow pus to escape into the general peritoneal cavity. The plan you should adopt is to find a suitable spot on the abscess wall where you intend to put the aspirating needle in, and then draw the intestines aside and protect them with sponges or with strips of iodoform gauze; so that there is an abdominal wound the floor of which is formed by the abscess wall on which you propose to operate, and the sides by layers of iodoform gauze protecting the intestines. A long aspirating needle should be used, and attached to it there should be a long india-rubber tube for the pus to flow through. Some surgeons when they have found the abscess try to draw it to the surface. Having evacuated all the pus possible by the aspirating needle, you should enlarge your aperture into the abscess and irrigate the cavity, and dry it well afterwards, and then stuff it with iodoform gauze. If the diseased appendages present themselves and be found lying loose in the abscess cavity there is nothing against your removing them; but you should not prolong the operation in an attempt to find them. One other point I ask you to particularly remember is, do not break down intestinal adhesions. These adhesions are acting a conservative part; there is no necessity to interfere with them. One of the least evil results which follow interference is a rather serious hæmorrhage. As the inflammatory condition subsides in the abdominal cavity these adhesions will be absorbed.

We now pass to the subject of peritonitis in general. It may be either a general infection of the peritoneal cavity, or it may be a localised infection. The varieties of peritonitis which are met with are tubercular, simple, septic, and specific. By simple peritonitis is meant such as follows injuries or blows; by septic peritonitis, that which ensues on some septic cause; and specific peritonitis is such as is seen in the course of acute Bright's disease, acute rheumatism, and syphilis.

To-day a few remarks will be made upon *Tubercular peritonitis*. This disease presents three types:—(1) ascitic; (2) fibrous; (3) caseating. In the ascitic form the fluid is either localised or diffused, and with it there may be tubercular caseating foci in the peritoneum. In the ascitic form you find grey granulations of tubercle on the recently infected peritoneum, and a considerable amount of clear fluid. In the fibrous variety there is a good deal of new tissue binding various organs together, and in the new connective-tissue there are large tubercular nodules, which are either recent or undergoing caseation; but as a rule, in the fibrous form no fluid is poured out into the general cavity. What is the relationship of the fibrous to the other forms? There is no doubt that the formation

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of fibrous tissue is an attempt at healing on the part of the tubercular peritoneum, just as in the case of a tubercular joint, when it recovers without operation, you find that the tubercular material has been transformed into fibrous tissue; or as in a lung with a tuberculous focus, at the post-mortem examination you find radiating from the caseating focus bands of fibrous tissue due to cicatrisation. It may be that the fibrous form is a more advanced form of the ascitic, in which an attempt has been made to get rid of the tubercle by causing the granulations to undergo fibrillation. In the caseating variety, which may originate or follow one of the other forms, the tubercles are large masses which have undergone caseous degeneration. You see between the coils of intestine large caseous masses, and often abscesses in the thickened adherent omentum.

As to the *symptoms* and *diagnosis*. It is not very difficult to make a diagnosis of tubercular peritonitis, especially if you frequent the wards of a children's hospital, where most of the cases are seen. You make your diagnosis by the history of the patient, that is to say, you inquire if the patient has tubercular affection elsewhere; by the age, for it generally affects young people, and you must take care to exclude other causes, such as Bright's disease, and so on. You know of the slow progress of the disease, the wasting; and what is more important, you can feel in the abdomen hard masses, and can feel the omentum lying transversely as a huge indurated mass over the front of the abdomen. Then, occasionally, the patient is brought in with symptoms of intestinal obstruction.

The *treatment* of this affection is either medical or surgical. With regard to the medical treatment, what used to be done in the old days, and was sometimes effectual, was that the patient was put to bed and given some sedative medicine to alleviate the pain, and a preparation known as oleate of mercury was rubbed over the abdomen. Under this treatment the patient sometimes became better for a time.

About twelve or fourteen years ago some observers noticed that if they opened the abdominal cavity of a case of tubercular peritonitis under the idea that it was something else, the patient got well, very much to their surprise. It is not possible to say certainly why that is so. Of course all sorts of explanations have been hazarded. One is that the tubercle bacillus is anaërobic, and that when the abdomen is opened and the bacillus exposed to the air it dies. That is not quite true; the tubercle bacillus does not always die readily in the lung when it is exposed to fresh air. Another idea is that the traumatism of searching about in the abdominal cavity sets up a new action, so that the disease undergoes cicatrisation. I do not think that is probable either, but we must leave the matter there. It is said by some observers that 70 per cent. of these cases treated by operation are cured. In my own experience that is too high; 40 per cent. I think would be within the limit. When you open such an abdomen you may find caseating masses of pus. You should evacuate the pus, clear out all the infected material as far as possible, thoroughly irrigate, and then stuff the cavities with iodoform gauze, which should be left in for twenty-four hours, drainage being provided by a wide rubber tube. It is important not to leave the gauze in for longer than twenty-four hours; if it is left the granulations grow into the interstices of the gauze, and the removal is followed by a gush of hæmorrhage. The reason for putting in a wide rubber drain is that several abscesses often communicate by narrow openings, and the pus wells from one to another. In these cases after operation there is a strong probability of intestinal fistula forming, and this unhappy event occurs very often, and the patient's condition is accordingly very miserable. But, as in the treatment of all tubercular affections, it is a matter of vital importance to get the patient away from the hospital into the fresh air as soon as possible. A large number of these patients so treated recover, and they may remain well for six, eight, or ten years.

BURROUGHS, WELLCOME AND CO. have introduced for use as an intestinal antiseptic in typhoid fever, tropical dysentery, and fermentative dyspepsia Benzo-Naphthol in tabloid form. Each tabloid contains five grains of the drug, and its administration can now be directed in a manner which secures not only accuracy in dosage, but also reliability in the therapeutic strength of the agent. The advantages of being able to prescribe this useful derivative of Beta Naphthol in tabloid form are quite obvious to all who have given it suspended in mixtures.

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A CLINICAL LECTURE ON CHLOROSIS.

Delivered at the West London Hospital,

By SEYMOUR TAYLOR, M.D., F.R.C.P.,

Physician to the Hospital.

GENTLEMEN,—I propose to have some patients before you after the lecture whom we shall examine in order to bring out the points to which I wish to draw your attention.

It is difficult to select a subject for a post-graduate lecture which shall at once add to your knowledge, and also shall be on a good clinical level and readily grasped. I have therefore glanced at my out-patient records, and found there a disease which is very frequent, and the result of treatment not always satisfactory, notwithstanding the generally accepted dictum that this disease has a specific remedy. The disease which I refer to is Chlorosis. The number of cases of this disorder which are seen at our London hospitals must be enormous. I find on making a rough calculation taken from records for a single year, that chlorosis accounted for 8 per cent. of my out-patients; so that one must, perforce, with such opportunities, and with ordinary clinical intelligence, gain much experience in the treatment of this interesting disorder.

At the onset I must demur to the name chlorosis, although I am not prepared with a substitute. There is no green tinge in the subjects unless the women be stout and of dark complexion. It appears to me that the green tint is due to the naturally dark skin in brunettes, which is toned down by the yellow adipose tissue beneath, an olive shade being thereby produced. But in blondes I have no recollection of seeing any colour which I could with a good conscience call green or even greenish. Perhaps I may be pardoned if I give you a short sketch of a case. The patient is, as a rule, a young unmarried woman, between fifteen and twenty-five years of age, that is to say, in her early period of sexual activity.

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There, to my mind, is the great crux of the whole question. She complains of breathlessness, dyspepsia, constipation, and some catamenial irregularity, whether it be leucorrhœa or amenorrhœa. She has frontal headache, and often pains or cramps in her leg muscles, especially towards the end of a long day. Her feet and ankles are occasionally œdematous, and she soon complains of exhaustion after, or disinclination for, work or exertion. She also presents various murmurs over the cardiac region, for the most part, however, restricted to the pulmonary area during systole. As a rule, nay, nearly always, she is plump and well nourished, notwithstanding that her appetite is depraved with a decided leaning to, or craving for, acids, sour fruits, or condiments, or "something sharp" as the patient graphically expresses it. If left to themselves without medical treatment such cases after a time present signs which suggest that they have developed gastric ulcer. This contention is foreign to my present lecture, and has been discussed in another place. I may, however, just turn aside for a minute. I hold rather peculiar views. I say that if a chlorotic girl is neglected and not treated she will assuredly, after a time, present symptoms of gastric ulcer. Or I will reverse it and say that every case of perforating gastric ulcer that I have seen, without exception, has had symptoms prior to the ulcer which pointed to the existence of the disease which we know as chlorosis. On examining the blood one finds no increase of leucocytes, nor indeed any marked diminution in the red discs. But the quality of the latter is at fault, and this is due, as you all know, to a diminution of the hæmoglobin within these red corpuscles. This condition may perhaps be represented graphically as a colony which is numerically strong, but which is individually poverty-stricken. Or it may be compared to a mint which, instead of turning out sovereign pieces of standard gold, manufactures a large percentage of base alloy. I repeat that diminution of hæmoglobin in the corpuscles is the pathological state which you have to bear in mind and to which your treatment must be directed, although there are other factors predisposing to its causation to which I wish briefly to draw your attention further on. It may be well to remind you of what hæmoglobin is. It is a compound product consisting of proteid substance with globulin and nitrogenous hæmatin, which readily crystallises when extracted from blood, and which behaves in the organism much the same as a colloid, inasmuch that it will not pass through, or only sparingly through, animal membrane. Although the hæmoglobin constitutes 30 per cent of the total quantity of blood, it contains only a minute trace of iron, less than 1 per cent., and in some of the lower animals, such as the mollusca, copper would appear to take the place of iron. The colour of the blood does not depend on the iron contained in the hæmoglobin. Indeed, in view of the small quantity of the metal, it is difficult to show how it could depend on iron. So that each bottle of our ferruginous mixtures contains enough iron to supply the whole deficiency in the blood if it were all absorbed into the system. The amount of iron in our blood is so infinitesimal, so homœopathic, if one may use that term, that if we absorbed all the iron which is given to us in our 6 oz. bottles of mixture there would be more than enough to recompense us for any loss of hæmoglobin that may have occurred. This deficiency of hæmoglobin is due not so much to destructive metabolism as to diminished supply; that is to say, the diminished acquisition of hæmoglobin consequent on malassimilation. All the excrementitious pigment, such as is found in fæces and urine, is diminished in chlorosis. Nay, even the pigmentary deposits seen in cutaneous moles lose their colours during the progress of the disease, although they still appear relatively darker in contrast to the surrounding skin. A chlorotic girl with a mole may have that mole somewhat blanched in appearance compared with the same mole six or eight months before, but the intensity of the colour returns with the improvement in the blood condition. This can be understood when we recall the fact that hæmoglobin is the origin of our biliary and urinary pigments. I am aware that a great scientific authority is against me on these points. Van Noorden says that absorption in chlorosis is carried on at a healthy rate and that metabolism is not interfered with. Now, speaking entirely from the clinical side, my observations do not agree with his, and I base such views as I hold on the treatment of this disease and on results of careful observation from an opposite pathological standpoint. For example, the cramp in the calf muscles, which is so often a distressing symptom, may be

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accounted for by a feeble supply of hæmoglobin in the muscles which have undergone the extra exertion, and this may occur during the time the patient is taking large doses of iron. It is always most marked in those cases which present most pallor. Similarly the acid craving which I have insisted on as being a most typical symptom, has always been regarded by me since I began to study these cases, as being due to a want of hæmoglobin which has had an acid reaction. It disappears after treatment is directed to the digestive functions, so that assimilation is improved. So long as this acid craving exists it is, in my experience, wrong to give medicines which contain free acid or any acid preparation, such as tincture of perchloride of iron. As Dr. Haig pointed out years ago, the chemical effects of administering hydrochloric acid are found in decreased uric acid excreted, while sodium carbonate has the opposite effect, and it would appear from his researches and those of other observers that sodium carbonate increases the solvent power of the juice of the alimentary canal.

I now pass on to the treatment, because after all is said and done that is the part which is perhaps most interesting to you. The profession appears as unanimous to-day as it was fifty years ago, that the one drug which is required is iron. The metal is regarded practically as a specific. Yet notwithstanding this, unsatisfactory results of treatment by it are frequent. It constantly happens that a patient under treatment by a doctor with no good results turns to another doctor and obtains relief. And yet iron is written down in the prescriptions of both. These unsatisfactory results have opened the door for unbelief in the efficacy of our specific remedy. Sir Andrew Clark wrote that he cured many chlorotic patients with Epsom salts. He argued that the patients suffered from a fæcal intoxication, which might be cured by a purgative. But we must not overlook the fact that he strictly dieted the patient, and by ordering an extra amount of fruit and vegetables he gave therein the amount of iron which the system demanded. Why, then, is it that we frequently have such unsatisfactory results of our treatment? When we prescribe ferruginous preparations in large or small doses unsatisfactory results do occur. In the main, however, the old if somewhat vulgar simile attributed to a St. Bartholomew's physician, by which a chlorotic girl may be compared to cast linen, is probably correct. He is credited with saying that these patients require "washing out, ironing, and then airing." Whatever foundation for veracity the anecdote may possess there is a certain amount of truth in it. I am convinced that every preparation of iron has its value considerably enhanced in the treatment of chlorosis by the administration of a preliminary course of purgative medicine. The rule obtains to-day as in time past, that iron should not be given unless the tongue is clean; in other words, until the stomach and duodenum are in a fit state to receive and digest the remedy. Again, given that a preparation of iron fails ignominiously in the one case and succeeds in another, this does not prove that our therapeutics are radically at fault; it only gives us a hint that the selected preparation is the wrong one. Probably no drug is more difficult to prescribe than iron. We must admit this when we take cognizance of the great number of preparations of this metal which have been sanctioned for use in the pharmacopœia. We have therefore to consider which preparation we shall select, and we must bear in mind that the presence of faulty digestion, of constipation, and of possibly individual idiosyncracy, may have something to do with our choice. In my early apprentice days my master, with no great scientific knowledge, insisted on the administration of a purgative for two or three days before he sent any mixture containing iron. He derived his knowledge from clinical experience rather than from strict or elaborate investigation. And he thereby hit upon what I have subsequently found to be a truth of some practical value. He did not care to prescribe Epsom salts with iron, as he argued, with probably some truth, that the alimentary canal cannot devote any energy to the absorption of iron while in the state of commotion caused by the cathartic. The probable explanation is that iron is only absorbed if the liver secretion and that of the glands which open into the duodenum are in proper physiological working order. If these views be true, iron is best administered at or about meal times, when digestion is most vigorous, the alimentary canal having been previously prepared as just mentioned. One reason is that the albuminous constituents of the meal favour assimilation of the iron. The iron, as it were, goes through into

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the system on a vehicle of albumen. The difficulty we have when ordering this remedy is to get it into the blood. We must regard the medicament as being on one side of the membrane and blood on the other side, both exhibiting a shyness of union. I have therefore derived some marked success in administering some of the preparations now in the market in which the albuminate of iron is the principal factor, such as Liquor Mangano Ferri Peptonatus (Gude). And here let us congratulate ourselves that pharmacy has not stood still during these last two decades. Our medicaments of to-day are vastly different from and for the most part superior to those which our fathers before us prescribed. We have now-a-days remedies which are built up after laborious research in the chemist's study, remedies with a really scientific basis, one of which I have just mentioned to you. Albuminous material combined with iron, I repeat, is often successful. I am not quite convinced of the *rationale* of the success. As I have said, it is possible that the iron gets incorporated with the albumin, and so becomes absorbed with this proteid body. I do not view with favour the idea that there is a chemical union. I argue that there is rather a physical union, which is favourable to absorption. Rainey and Ord's experiments have indicated the strangely beautiful behaviour of crystalline forms which precipitate in the presence of a colloid body, and I have always thought that observation formed an extensive field for research in the domain of therapeutics. To those of you who do not know Rainey's and Ord's experiments I may say that it is well known that a crystal "comes down" invariably in a given shape; but if it is precipitated in fluid which contains the slightest trace of a colloid, then the shape of the crystal is altered entirely, and tends to become spherical. The dumb-bell crystal of the triple phosphate is a crystal which you seldom or never see in healthy urine, that is to say, in urine free from albumin or other colloid. The dumb-bell shape is, to my mind, a compromise between the ordinary crystalline-shaped phosphate and of the sphere which it tends to form. All crystals therefore tend to the formation of spheroidal bodies in the presence of colloid fluid. Following this idea, I often prescribe the carbonate of iron in combination with a whisked egg and a little white sugar. That preparation of iron is very easily taken, is not disagreeable, and is fairly well digested. Or the egg may be very slightly boiled for two minutes. By this means a very palatable and efficacious mixture is formed. But I cannot too strongly insist that the carbonate of iron must be quite fresh.

In our zeal for modern pharmacy we must not overlook our old friends, however. We have few better prescriptions in our dispensaries than the Mistura Ferri Composita, commonly known as Griffith's mixture. Here again the warning counsel comes in; the mixture must be freshly made. In a practice where there is no great turnover of stock, so to speak, this preparation is liable to decomposition, and the remedy becomes almost inert by keeping. I have seen on the surgery shelves of some of my *confrères* in the country stock bottles of this mixture which have been practically useless. Yet this difficulty may be overcome by keeping the iron sulphate and the myrrh and the sugar in solution in a well-stoppered bottle, the carbonate of potash being added only when the mixture is sent out to the patient. If the whole mixture is kept together in a bottle, decomposition occurs after a time and the mixture does little or no good. Similarly old and hard pills of iron are valueless, or they may be only of so much efficacy as so many iron bullets fired into the system. Oxidation of the iron salt occurs from exposure to the air or from constant contact with other oxygen compounds, and oxygen makes the remedy comparatively useless. For this and other reasons I hail the advent of the bipalatinoids with pleasure. Here we have a biconvex disc made of some soluble, possibly gelatinoid, material, with a diaphragm which divides the disc into two compartments, one of which contains iron sulphate and the other carbonate of potash. The envelope is readily absorbed by the gastric juice, and the two separate constituents come together for the first time and form an easily assimilable chemical compound of the highest value.

These, then, are the conclusions which I have arrived at in the treatment of chlorosis, which may be briefly summarised as follows:—The carbonate of iron is the most efficacious remedy. Secondly, whatever preparation of iron may be prescribed, it must be fresh and free from oxidation. Thirdly, until the intestinal canal is clear and the digestive functions are in good order, no preparation is of much or any avail. But this is

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not all. Chlorosis refuses to come within such a simple limitation as this implies, and consequently we meet with cases in which all these precautions have been taken and yet failure results from our treatment. The reason, I find, is that there is more than one type of chlorosis. There is the type in which dyspepsia and stomach symptoms are the most pronounced, and these are more pronounced still as the pallor increases. Secondly, there is the neurotic type, in which hysteria and other nervous manifestations are so common. This patient is often thin and ill-nourished. There is yet a third type, in which pallor and breathlessness are the marked features. These patients are for the most part plump, well-nourished young women. All these varieties, as I have contended elsewhere, show, sooner or later, if left to themselves, symptoms which to say the least are highly suggestive of gastric ulcer. In the dyspeptic class I invariably treat the dyspepsia first. It may be that it requires a week or month or even longer before we restore the proper functions of the stomach, but until this happy period arrives I am averse to the exhibition of any ferruginous remedy. I have records of a good many failures mentioned in this line of practice. Therefore I give a simple stomachic mixture containing bicarbonate of soda, hydrocyanic acid, and gentian, to which may be added cascara, euonymin, or other purgative, if necessary. At the same time the patient is rigidly dieted. The patient of the neurotic type is often more difficult to relieve. The want of nutrition may be attributed in part to dyspepsia, which is also present, and in part to the disinclination to take food, which is a frequent symptom; this condition bordering on the anorexia nervosa which Gull described. Here valerian is of great use, and the ammoniated tincture may be added to the prescription. Afterwards, when food is being assimilated, we may add cod's oil after meals, and possibly also iron, such as steel wine, which we often give to delicate children. The third type may begin to take iron earlier than the others, and arsenic may be given in addition. Some physicians contend that arsenic is the saving remedy, and that when iron fails to relieve it can be supplemented or supplanted by arsenic. Whether this be so or not, arseniate of iron beginning with $\frac{1}{8}$ of a grain three times a day is a valuable remedy.

But, whatever preparation of iron be selected, I cannot too strenuously insist on your careful estimation of the percentage of hæmoglobin in the blood. This estimation should be made at least once a week, and the preparation changed from time to time if no progress be made.

In other words, gentlemen, the measure of the utility of your prescription will be given to you by the hæmoglobinometer. If the weekly examination of the blood shows you a steady—it may not be a great—increase in the amount of hæmoglobin, then that prescription may be continued. But if, on the other hand, the amount of hæmoglobin stands still, or is even diminished, another preparation of iron must be found. I find the percentage of hæmoglobin after careful administration of a proper and suitable preparation of iron varies from 1 per cent. to 3 per cent., the average being 2·11 per cent. This computation is taken from forty-three cases in my out-patient work.

Beyond all this, there is to my mind a deeper cause of chlorosis, a subject which requires most delicate handling, but on which I hope to speak to you on a future occasion.

Adenoid Vegetations.—J. P. Morton believes in operation in every case, because—(1) Of all the well-known evil effects of mouth-breathing. (2) In 85 per cent. of chronic suppurative otitis media cases in children adenoid vegetations are the cause, and are almost invariably the cause of temporary deafness in young cases. (3) The presence of adenoids renders children far more subject to all the infectious diseases, the germs of which gain admittance through the air-passages. (4) The mucous membrane is kept in a chronic catarrhal condition, and is liable in after years to the atrophic conditions. The sooner the operation is performed after the diagnosis the better. The author has a patient six months old in whom the operation was done after cleaning out the mastoid antrum. As adenoids often atrophy of themselves, some writers advocate giving them an opportunity to do so. But in the meantime the child is risking the infection of measles, diphtheria, and scarlet fever; is perhaps contracting middle-ear trouble, becoming stupid in appearance and mind, and is developing a chronic catarrhal condition in the nose and throat.—*American Journ. Obstet.*

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WITH DR. SAVAGE AT BETHLEM ROYAL HOSPITAL.

V.

GENTLEMEN,—We now come to the next stage in our subject, and we shall deal to-day with an entirely different class of disorder from anything which you have hitherto seen in these classes. Under it we place the cases of what used to be called monomania; cases that appear perfectly sane in every other relationship but the one, and who may be in perfectly good general health, yet have a mental trouble which, I regret to say, is very serious, and one which is almost always incurable.

The disorders that I am going to speak about chiefly to-day are those which are called delusional insanity, or the insanity associated with organised delusions. By that one means that false sensory impressions are conveyed to the mind of the individual and the individual acts upon this false information. Suppose messengers bear false messages, then people are likely to be misled. And so, if a person's senses are misleading him, he slowly builds up a wrong mind. He is misinformed, and as a consequence of the misinformation his judgments are wrong, and he has all sorts of false ideas, *i. e.* delusions. This alone may be almost a monomania. Take an example. Yesterday I had a good-looking girl of under thirty years of age brought to me by her sister with this history:—"My sister has taken to Art as a profession, although there is no necessity for her doing so, because we are well enough off. She studied and did pretty well. Two years ago she thought it would be a good thing to study at the Continental schools, and she went with another lady artist to Paris. There, in the French studios she did drawing from the nude, under good masters," She was leading a rather Bohemian, but yet not an immoral life, perhaps, in fact, rather wishing that she might. Nevertheless she seems to have behaved very well. And then there came across her path another student—a gentleman—and they decided that they would be as brother and sisters, so that these two girls when they went about should be accompanied by this young Englishman. And then she got an idea that it would be better to have a kind of understanding to prevent scandal that they were engaged to be married. This continued all right for some time, and there was nothing very unusual in the patient's conduct. Now comes the illness. She got restless, sleepless, and there was a certain amount of suppressed eroticism, and next she developed ideas that people were talking scandal about her. Doubtless there was some truth in this. Other students probably passed by and smiled, and thought, and perhaps said, "I wonder what are the relationships existing between those two girls and that man." She began to hear the passers cough; and then she was sure that they were called improper characters; she then thought that this man himself was telling his artistic friends that she was his mistress. She imagined she heard communications and hints at night, and later on she felt electrical shocks at night. She discovered there was an empty house next door, and she was quite convinced that this man had taken it and was annoying her through telephones and other electrical machines. As I said before, the last developments of science are always appropriated by persons of unsound mind to explain their feelings. This girl was afraid of taking her bath because she believed that X-ray photographs were being taken of her during the process. She was very indignant, and broke off the engagement altogether and abused the man. He was mystified and could not understand her behaviour, and he was still more surprised when, still in a state of suppressed desire, she threw herself at the head of another man and became engaged to him. But soon she became convinced that he also was in the plot, and accordingly threw him over too. Still in this state of unsatisfied desire, she sought a third person, whom she believed to be more suitable,—an older man who would not be so likely to say improper things to or of her. Being a good-looking and attractive woman she soon found such a man. But she no sooner got settled in that relationship than she began to abuse him, and she felt sure the plot was still in existence, and that he was forced to be a party to it. When she came to see me yesterday she talked about Art, about pictures, about Paris life, and about the Exhibition; she spoke about England and persons and places in it, all as reasonably as one could wish. Then I

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said to her, "What about these noises?" She said, "Yes, these noises are absolutely existing, and you cannot persuade me they are not." I said, "No, I do not attempt to persuade you; I simply assert that they are not. You say that when coming in the omnibus persecution and annoyance of the same kind occurred. You had to wait in my waiting room, and you say somebody was even there whispering to and annoying you. You were not sleeping at Paris last night but in your sister's house, and yet there was the same system of annoyance carried out. It does not seem to matter where you are, there is the same irritating attention paid to you."

Now although her memory, will, artistic acquirements and capacity are as good as ever they were, she is dominated by this idea that she is being watched and followed and interfered with to her injury. I am afraid that this trouble dates back nearly two years, and the only way of looking at it, unfortunately, is that it is a morbid, mental growth. I mean that just as you may get cancer involving all the tissues, so you may get a disorder of this sort involving all the faculties. The chances are that this girl may have to be sent to an asylum. At present her sister and others have been able to manage her. She said, "Will you give me a chance, will you allow me to select a lady companion of my own, will you allow me to go to a part of the country where nobody knows me, to go under my own direction, but with such a nurse or companion as I may select and you approve? I said, "Yes, you may try that." I have known complete change of environment break down these troubles and remove them, something like the surgeon removing a morbid or malignant growth. You may occasionally succeed, but, unfortunately, it is only a very exceptional thing. In one or two cases I have had in Bethlem I have followed the wise man's advice, and answered a fool according to his folly. There was one young fellow who believed there was a system of annoyance, and that there were voices on the roof that were constantly jeering at him. He was allowed to see the roof to show that it was not so, but it did not make much difference. He said he must explore it, and one did not feel inclined to let him do that. He said that if he could go down to our Convalescent Home in Surrey and there stick in the middle of the cricket field for a whole day, and if he could still hear voices, though he could see that nobody was within range, he would know himself to be mistaken. He was allowed to go down, and he was convinced that there were no people there although he heard the voices. The effect was not an immediate and miraculous cure, but it loosened the hold of these delusions upon him, and he slowly improved.

Hallucinations, illusions, delusions—what are the differences and what are the relations one to another? An hallucination of a sense is when you have a sensory perception without any impression from without. That is to say, a person in absolute darkness sees bright lights and faces; a person in absolute stillness hears voices and hears sounds of one kind or another. An individual in a perfectly pure atmosphere smells a bad smell. Those are all hallucinations. A person having nothing the matter with his skin feels electrical shocks. That is an hallucination, too, and they all go a long way to construct the disorder, delusional insanity, about which I have been speaking. Then there are illusions, that is to say, a misinterpretation of impressions. Those also are very common. A person sees something and mistakes what he sees,—he sees a cloud and thinks it is something else; he has a foul tongue, the result of alcohol, and says he has been poisoned; he has some defect of smell and misinterprets the bad smell; he has some local cause of skin irritation and misinterprets that. He has a subjective impression. Then comes a kind of intermediate condition, in which the normal impression is mistranslated or misassociated. We are all of us rather given to misinterpret in that way. Let us take a common everyday thing which most of us have experienced. Some things do not refer to you, and yet you appropriate them to yourself. I remember having as a fellow student an extremely sensitive person, and he and I lived together for some time. If he saw me and another man talking, this friend of mine could be seen fidgeting about, and when my companion had gone he would say, "What were you saying about me?" Of course I was not saying anything about him. These people appropriate things as pertaining to them which really have no connection with them at all. I had a man say to me last week, "Why should I blush,

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and why should everybody notice it?" There was a young fellow, who I believe is still in one of the public offices, who came to consult me as to blushing, which bothered and troubled him. He said, "In the position I hold the blushing is most annoying." He said, "I go to one of the other departments, and the hurrying brings a flush to my cheek, and people turn round and look at me and say I am a sexual offender in some way. It is not true. Why do they say it?" "They do not say it," I replied. "But they do say it, or they indicate it." Everything with these people has a related value. Some of you will remember my speaking, in one of the earlier lectures, of a case of this kind, in which the man was in an exaggerated condition of suspicion and self-consciousness. In a diary of his, which came into my possession shortly afterwards, there was a whole series of diagrams and remarks written in shorthand about a neighbour who lived opposite. The neighbour who lived opposite had four plants in his window. His diary ran somewhat thus:—"Monday: To-day the pots are in order, 1, 2 and 1, 2. Tuesday: I do not know why, but the pots are 1 and 3, 2 and 1. Wednesday: It is incomprehensible what he is doing with those pots, because to-day they are 1, 1, 2, 3." So as these pots were varied, as the changes were rung on them from one to four, he took it that they indicated certain vices or faults in him. It was he also who, coming down from his room in his lodging, noticed outside a bedroom door the boots of the husband and the wife. One day it happened that instead of the two boots of the husband standing next to the two boots of the wife, there was one boot of the husband and one boot of the wife and then one of each again. His remark in his diary was "Boots wrong; evidently marital incompatibility." He built upon this a theory that the husband might be jealous of him, and might assert that there was something wrong in his relationships with his wife. This example will show you how these delusions may arise. There is scarcely any limit to the disorder that may occur in relationship to such hallucinations and delusions. You may have a delusion as the outcome of hallucinations, you may have delusions as the outcome of an illusion; you may have a delusion as merely a misinterpretation of real actual perceptions.

Another thing to be remembered, and a very important thing, is this. I have told you that these perversions may be like a malignant growth, they may invade the whole mind. But, unfortunately in most ways, it is not malignant enough to kill, it is only malignant enough to destroy the mind, so that patients with these hallucinations and with these organised delusions will go on living for a very long time. Another important point is that this type of disorder is very common in highly neurotic families. The varieties of the affection are almost without end.

Here is a patient who was admitted into Bethlem Hospital twenty years ago. I remember him as permanently deluded all that time. He was last admitted thirteen years ago, but his first appearance here was twenty-seven years ago. He came of an insane stock. Masturbation was given as a cause; at all events it was one of the associated causes. The second cause of his disorder was an ill-regulated and self-indulgent life. He smoked morning, noon, and night, and was not particularly temperate either. He had and has hallucinations of sight and of hearing. His appetite he tells us is first-rate. He is one of the most useful men in the place; he gets through a lot of hard manual work. He reads the papers and takes an interest in the Boer war, and you will notice he can tell us the recent developments of it. He says he has "loud thoughts." That is very important. Patients will constantly tell you, when they are suffering as our friend here has suffered, that they have "loud thoughts." Such thoughts may cause the patient to act in very strange ways. You have perhaps heard of the old play called "The Palace of Truth," where everybody spoke what they thought; and you can fancy the uncomfortable consequence that followed. But what would it be if everybody said not only what he thought, but if all his thoughts were loud also? You can hardly conceive a more confusing state of Society. It would lead to anarchy at once. Again, a person who has loud thoughts does not recognise those thoughts as his own. I suppose most of us dream, and after dreaming we think, "Well, how on earth could I have dreamt such a strange, foolish, and unreasonable thing? And yet, during my sleep I have accepted it as if it were perfectly true." Supposing a person has loud thoughts, and sup-

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posing he does not recognise those thoughts as his own, and if he has spent the greater part of his life in checking evil thoughts and desires, and if those thoughts are nothing but the expression of evil thoughts and desires, he says, "Well, I hear those thoughts, but they are not my thoughts, therefore they are the thoughts of somebody else that are injected into my mind." I think very few weeks pass without patients telling me that they are annoyed by having thoughts injected into their minds, and as a rule they say these are horrible beastly thoughts.

Another extraordinary result sometimes of loud thoughts is that the man says, "If I hear my thoughts, you must hear my thoughts too." A year ago a man was admitted into Bethlem Hospital on a certificate saying that he was in the habit of getting on to Hampstead Heath by daybreak with a supply of food, simply sitting on the highest part of the heath, and quietly moving round and round. There he sat until dusk so that no one could come within earshot and hear his thoughts, and it was thought necessary to remove him to Bethlem Hospital. I saw a patient yesterday who has most dangerous hallucinations, which are associated with epilepsy. He was formerly in the Army and had had an injury to his head, in consequence of which he had a large piece of skull taken out. It was found afterwards that this operation made no real difference to his fits. Before he has an epileptic seizure he always hears a voice; and, oddly enough, whenever he has had a severe epileptic fit followed by homicidal violence, he has always heard contradictory voices calling him a fool, a blackguard, or a low-minded creature, and these wranglements drove him wild. That is to say, the aura of his epileptic fit is an auditory hallucination. This man before us has both hallucinations and illusions. He has loud thoughts, and sometimes says that thoughts are put into his head by other people. He says that last night, after a series of fits, he had a curious dream, which was that he was put in a strange place, made to walk as hard as he could over cliffs and mountains, and he woke up quite tired. This man's memory as regards the past is as clear as ever, and yet he is slowly degenerating into a weak-minded dement. He is industrious, self-content, isolated, and does not want companionship; he has the companionship of his hallucinations.

There is another very important thing in connection with these hallucinations. We had two years ago in this hospital a man who had spent a year or more in France. When he came in here he had hallucinations of hearing very markedly. He preferred, like the other patient, to be alone. I asked him why, and he said, "Because you know I have a spiritual wife located about my epigastrium, and she talks to me. But now and then I get annoyed, because there is another voice which chaffs me about it." You may have an hallucination as an isolated thing, or you may have it associated with other hallucinations. Thus, our patient said, "When my spiritual wife and I go out for a walk and talk, then I have sweet smells like flowers; but when this nasty contradictory voice comes in there comes a puff of stink." So, in the same way, individuals as a result of their early education see devils and have an associated smell of brimstone. Once more, the patient said, "It is all very well to talk of my hallucinations, my spiritual wife is not myself; it is ridiculous for you to say she is." I say, "How do you make that out?" He replied, "Because she speaks much better French than I do." At first one wondered how one would get out of this. I asked him whether the professors at the French school spoke perfect French, and he admitted they did. You see the voice was the reproduction of the perfect French he heard at school, which was better than he could speak. When you come to hallucinations of this kind you must remember it is a kind of unrolling of the scroll of things which you have heard. This man heard good French, and it became registered in his memory. My explanation did not satisfy him. Because he heard French of a pure Parisian accent he concluded it must be something outside himself. We must all recognise that we have heard foreign languages and things of that sort, have seen the acting of a famous actor, we know the difference between a well-recited or a well-acted thing; but it does not follow that we, who are the judges of capacity to recite, should be able to recite or act as well, and so the hallucination may appear much better than anything which the patient believes he could produce himself.

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Now we will see another patient. He has been here nearly seven years, and he has been more or less worried by delusions ever since he came. He says he has been worried by his own people. He says he should have been a married man. He lived in a camp abroad, and seldom saw any females. He rode a great deal and sometimes hunted the puma. His general health is pretty good. He dreams occasionally. He says the noises worry his mind. He says the night watchman comes with the intention of annoying him, that the night watchman visits him to see his mind and read it. Some years ago, when living abroad, he wounded an uncle, and a relative held resentment against him, and intended punishing him for it. He was near an Indian settlement at the time and had skirmishes with them. He is quite certain that that was the starting part of the annoyance which he still feels. He says his parents were misinformed about the matter also. It is not of so much importance now, as the process of annoyance has, he hopes, been put down. He reads the papers. One of the dangers of such cases is that they become mentally tender, they feel that everything refers to them. There is a young lady here who is very anxious to be discharged from an asylum. When I saw her quite recently she was very abusive, because she said that by my causing her to be detained I was preventing her from getting married; that it was quite right she should be married, and that I had no right to stop her. Before she was admitted into the asylum she was a contributor to the daily papers. She now thinks that the enigmatical sentences found in Column 2 refer to her, and she has a most voluminous correspondence going on with reference to these.

I saw a man at Virginia Water the other day who, twenty-five years ago, was admitted into Bethlem Hospital, and he has never been free from delusions since. In his case, too, he thinks everything has reference to him. This patient before you says he is not unhappy, but he would feel happier if he had his liberty. He would then go about his business, that of a farmer, and he would go to Patagonia. He says his food has sometimes been adulterated. I of course asked him with what object he thinks it has been done. Many of these patients think the object is either to cause them sexual exaltation which will lead them into trouble, or else to render them insensible, and thus to allow others to injure them. It is not at all uncommon for these people to tell you that they are chloroformed at night, and that all sorts of liberties are then taken with them. I saw a lady in the country ten days ago who talked quietly and nicely about everything until we came to the question, "How do you sleep?" She replied, "I do not know: I go to sleep quite naturally at night; I wake up at perhaps four o'clock in the morning and feel all right and rather refreshed by my sleep. Then I lie down again and sleep; but now it is not the ordinary sleep, there is something in the way of chloroform or ether which is injected into my room, and I am rendered insensible, and when I awake I feel bruised and lacerated, and I am sure I have been raped." There is a patient in the hospital now who has had these ideas for forty years. Her ideas are followed by a consistent reaction. This lady, who is seventy years of age, used to take two ends of a thread and stick them across the door. Of course the ends dried and fell down, but their not being in position in the morning she interpreted as evidence that someone had been into her room. She said to me, "You cannot deny that people come into my room." I said, "You take what you consider to be precautions?" She said, "Yes," but could not be persuaded that the threads would fall naturally when they got dry.

Hallucinations may be single, for instance, there may be hallucinations of hearing only. On the other hand, there may be hallucinations of sight associated with those of hearing. I remember a young lady who was in Bethlem who used to complain that the King of Death was always before her, and that he used to incite her to suicide by asking her to come and join his family. When asked to describe the King of Death, she said he was a hideous man with a yellow umbrella. Where she got the idea from I have no conception. One of the interesting points in the case was that local treatment was applied to the ear, and as a consequence she lost the hallucination of hearing; but she retained the hallucinations of sight. She said it was much more annoying to see this yellow umbrella of the King of Death beckoning to her and not to hear what was said than it was before; she thought it

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was much better to hear and see the worst. Patients suffering from combined hallucinations often accuse particular persons of being their enemies. Of course it is quite logical, if you are annoyed, to think somebody is the cause, and next comes the question, "Why do they do it?" We seek an explanation for everything which goes on around us. A man feels that he is annoyed, and because he cannot see the person who annoys him he thinks there is some occult influence at work. In consequence of this explanation I see patients constantly who complain of spiritualism and spiritualists, but this is not nearly so common an explanation as it was twenty years ago. Twenty years ago persons who suffered thus almost invariably told me it was "spiritualism." At the present day it is hypnotism. From time to time I meet persons who say it is the Christian Scientists who are doing it. A wave of scientific discovery or a new fad comes over the country, and immediately these sufferers seek the explanation of their mental derangement in that. If there should be an Anti-Popery riot these people would say that the Jesuits were at the bottom of their trouble. Again, if there be a discussion as to the good or evil of Freemasonry, then these patients say their troubles are due to masonic influence. But altogether, perhaps the theosophists are the people who, now-a-days, are accused of causing the trouble most constantly.

Here is a man æt. 36, a Protestant; he is supposed to have had sunstroke. There is no neurotic heredity recognised in his family. He hears voices, especially at night, which abuse him and call him names. He admits striking people whom he thought annoyed him. He becomes excited and violent. He hears voices which are constantly making disparaging remarks about him, and similar remarks are often made by persons with whom he comes into contact, so he feels at times an irresistible impulse to do them an injury. Such patients as these are both homicidal and suicidal. A young officer was brought by his relations to see me a few years ago. He said, "Well, I should not have stood the insults which I have been subjected to in coming to your house if I had not been an officer in the Army; I could not damage the reputation of my regiment by thrashing a man in Regent Street, but that he put his finger in his mouth suggestively is too annoying. He suggests that I am a sexual offender. It does not matter whither I go, for people in the omnibus pass on the same sort of thing; even refined women also." Such patients have ideas that something is indicated or hinted about themselves. A young lady, who died afterwards of some acute brain disease, was extremely annoyed because she said I was no better than the railway porters. She said it was no business of mine or of the railway porters if she did menstruate every three weeks, but she did object to my holding up three fingers, and she objected still more to the railway porters saying, "Poor little three weeks." The whole thing, she said, was a low-planned system of annoyance.

Now here is a patient who questions his right to be in here. He is a young man. He says he has been arrested and brought here unjustly. He wants at once to be set at liberty. His mother died some time ago, and he thinks that if he had stayed with her and taken her arm she would have been less tired and would not have died. He says, as you hear, that his title is late Monarch of Hungary. He thinks he would have liked to have been with his sisters and pursued his geological studies. He says the Emperor of Austria is no longer an apostolic king when he himself is present. He says he is not supposed to be in here; that this is a very good place for real illness, and "for men whose brains have not been so intimately connected with dons at college as his has been." Now comes one other very important point. This young man comes of a very insane stock. His uncle was a patient here when I was assistant medical officer, nearly thirty years ago, but he got well. He has had other relations who have been insane, and other relations who have been distinguished in Science. He was brought up and educated at Cambridge and was sent on to the Continent. There he developed ideas that people were annoying and watching him. I have no doubt his exaltation is due to his having spent much of his time dwelling on possibilities. I sometimes make use of the term "governess' exaltation," where the "I wish I were" becomes "I am." Such an example is a lady who was living very quietly in the country, who thought what a fine thing it would be to be a duchess. Time went on, and there was no real life interest, and there were no children to

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occupy her attention. Then came back the idea, "Oh, that I were a duchess!" This altered in due course to "I am a duchess." In the same category comes the English governess who went into a family of Russian princes. She led a hard-working, painstaking life, having to be conventional, and being treated like dirt by the family, but being expected herself to treat the servants as below her. So she was thus doubly isolated. She dwelt on the idea, "If only I were a princess; oh, if I were something bigger than a Russian princess." She became, in her own idea, Princess Bismarck, and as such she was admitted into Bethlem. A young fellow who is over-educated, educated out of his position, dwells on the idea, "If I were a great person, if I had aristocratic blood in me." He goes on dwelling on "Might have beens," and then finds that people are not treating him as well as they ought, that they are not really treating him with proper deference. He gets into that condition of believing that everything that has regard to him is not done with sufficient respect to him.

There is another way of interpreting this exaggerated self-consciousness, it is that the man believes everybody is looking insultingly at him, and then he may think he is followed, shadowed, or pursued. Or it may be that this feeling of being constantly noticed slowly passes into the belief that he must be a king to be taken so much notice of wherever he is; and so he gets the idea that he is royal. At all events it is worth your while to remember that there is a form of organised delusional insanity such as we are describing in which some such morbid mental process as this takes place:—A young man or young woman belonging to a nervous family gets upset physically or morally, is overworked or under-worked, or has physical strain or illness. He gets depressed as a consequence, and passes into the condition which I call "the lost-button stage." Any one of you walking up in the West End may suddenly discover that one of your buttons has gone. A person passes you and smiles, and you say, "Bother that button." Everybody who passes you seems to look down and to notice that there is a missing button, and smile. Or you may get a splash of mud on your collar, and if any person smiles to himself as he passes, you at once think he is laughing at your dirty collar. If I go down Regent Street with the notion that people are going to look specially at the end of my nose, I, of course, soon find fifty people do so, and presently it seems as if the eyes of everybody are focussed on my nose. I expect, *i. e.* look for a thing of that kind, and it comes. Such a person as I have described, passing through the self-conscious or "lost-button" stage, may gradually develop the idea of persecution. It may be first of all like the early stage of depression, without any delusion at all. First of all the patient says people are watching him, but he does not know who they are. That is vague or unorganised. Then there comes the idea that he is watched by men, and they may be Jesuits, or they may be Freemasons, or they may be Fenians. Cases of this kind find somewhat of a parallel in cases of melancholia. A man may lose a lot of money and then pass straight away into melancholia because he feels sure he is ruined. I saw recently a manufacturer who, in developing his business, had spent a tremendous lot of capital, for which there was an overdraft on the bank. He said, "I am ruined, I shall never be able to recover myself." There was, of course, ground for anxiety, but not for unreasonable anxiety or despair. So a man may have reason to be suspicious, and the feeling may grow to a morbid degree. Take as an example a man admitted into Bethlem fifteen years ago at the time of the Fenian movement. He was a detective sent to Germany to watch one of the big dynamite manufactories. He was a man who could speak most European languages; he was either a Russian or a Pole, and was employed by the English Government. He had a belt round his waist containing Russian, German, Italian, and Spanish money, so that he could be off and follow out any clue at a moment's notice. He led a very unhealthy life, suspecting, watching, and following everybody, until at last he began to believe that he was being watched himself. The next stage to that was that he was sure there was a plot to murder him. And then he bolted and appeared in England panic-stricken with the idea that there were Fenians everywhere—in the omnibus, in the railway, and that if he stayed at an hotel there were Fenians waiting around him. In fact that was a very good example of one idea dominating and ruling a man completely.

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After this stage of depression it is not an uncommon thing for people to develop grandiose ideas. So that after being suspicious of everybody and fearing everybody, you may find ideas of grandeur manifest themselves. In other words, persecutional mania may be followed by grandiose ideas. I have told you that these people are both homicidal and suicidal. Time does not suffice to give many examples of both. A sailor about whom I was consulted, who, I believe, is now in Broadmoor, was quite sure that men on board ship accused him of being a sodomite, and his rest was disturbed at night, for no sooner did he put his head upon his pillow than he heard "Sodomite." He got anxious and worried and led a more and more solitary life, until in shunning others he thought people were avoiding him. One morning he sprang up from his berth and drove a big clasp-knife into two of his shipmates. That will show you the danger that may arise.

Another very important thing is that sometimes these people will deny their suspicions. I am to see a patient in the course of a few weeks who has been convicted of a crime at a foreign court. That man will deny anything and everything. He will chaff about his delusions and will deny them altogether. People with these ideas are so much on the alert that it will often take many visits and a great deal of care in questioning to get at their delusions. Even the elect may be deceived. People who believe themselves to be watched and persecuted become more and more suspicious of everybody. I am to see a lady tomorrow about whom the doctor writes, "I do not know how you will manage, for directly she hears of a stranger she says 'There is a stranger, I will not see him.' Or if she does see him she is as bland and conciliatory as possible. The instant you have gone she will make inquiries about you and give strict orders that you are not to be admitted again." A patient was in Bethlem Hospital some years ago who had all these ideas. Some people have been described as wandering maniacs, or wandering melancholiacs. They have been said to suffer from "melancholia errabunda;" there is a regular traffic between England and America and between America and the Continent of such people. Some of these individuals have wandered all over the world. The one I refer to—a doctor—was admitted into Bethlem, and when he had been here for some time I felt sure he was improving, so much so that I allowed him to go with a Roman Catholic priest to visit the poor in the neighbourhood of Bethlem. Doctor and priest used to visit the sick and come back to the hospital by tea-time. Everything went on nicely. I had a talk with the priest, and he said, "The doctor is perfectly well; he has lost all those ideas." I said, "I should like to talk with him." I did so. He said, "It is extraordinary, the truth of your observations has been shown, for my delusions have slowly disappeared, as you say they sometimes do, and now I fully recognise that they were delusions, and it is interesting to look at them from the outside." I swallowed his statement and wrote to his brother, and said that as his brother was quite well, what should we do?" He replied, "I cannot come for him, I am too busy just now; but I send cheque for £10 and hope you will not mind letting one of your attendants secure his ticket, give him the balance of money, and wire when he is sent off." This was done, and next day a wire was received, "Brother not turned up." Next day to that there was a wire from Liverpool, "We have a lunatic at large full of suspicions and delusions, with Bethlem Hospital on some of his clothes." The man had deceived me entirely, and, as I say, had been allowed to go at large. Within twenty-four hours he had fallen into the hands of the police as a result of his delusions. So you have to remember that there is very grave danger and difficulty in observing such cases.

Hallucinations, delusions, and illusions may occur in any form of mental disorder. You are not to suppose that every person who has an hallucination is going to become one of these cases of chronic delusional insanity. The types of this disorder which you will frequently come across are those where there are ideas and suspicions of persecution following on poisoning. A melancholic person may have hallucinations of hearing; he may hear the voice of God saying, "You are damned," or he may hear the voice of the Devil saying, "You are mine." They may have hallucinations of sight; they may see heaven open; or, on the other hand, they may see hell open and smell brimstone. In mania there may be any number of shades, ranging from delirious mania

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to hysterical conditions, such as the hysterical case I saw yesterday, in which a young woman, only married a few months, saw processions of faces through her room bent on annoying her. She could not understand why there were so many of them about the room.

There may be hallucinations and other disorders of the same kind in almost every form of insanity.

Organised delusional insanity occurs most commonly in people who come of insane stock, but you meet with it in alcoholics. Therefore, the chief danger in your prognosis or diagnosis and treatment of such cases will be to differentiate between alcoholics and chronic incurable cases of delusional insanity. One is inclined to think that just as alcohol produces grave nerve troubles in the centre—brain and cord,—it also produces great changes in the peripheral nerves, and that the insane interpretation of a peripheral neuritis may be ideas of persecution. So that an individual who has been drinking heavily may believe that he is being electrified, *i. e.* that he is receiving electric shocks, or an alcoholic who has got gastric trouble may believe himself to be poisoned. Therefore, in all cases of delusional insanity be sure to exclude alcoholism before you give an absolutely bad prognosis.

SOME POINTS IN THE TREATMENT OF CHRONIC HEART DISEASE.*

By SYDNEY H. LONG, M.B.Cantab.,
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For purposes of discussion this afternoon, I limit the term chronic heart disease to such deranged conditions of the circulation, with its concomitant effects upon other organs, as are primarily induced by acquired valvular disease. Time would not admit of a discussion extending beyond this limit.

* Delivered before the Norwich Medico-Chirurgical Society.

Now the question of treatment in heart disease is so intimately blended with, and based upon, a preconceived accuracy in diagnosis, that it is impossible to discuss the one without some reference to the other. I therefore propose, first of all, to make one or two general remarks upon diagnosis. In examining a patient from the point of view of cardiac disease, we arm ourselves with some form of stethoscope, of which there are nowadays a multitude of different forms, from the old-fashioned unjointed wooden article up to the expensive and elaborate piece of mechanism called the phonendoscope, the chief virtue of which lies in the fact that with it you can examine your patient without removing any of his clothing, not excepting an overcoat. Now, in my opinion the introduction of these so-called highly finished instruments of scientific accuracy is no unmixed blessing to the profession, and I am sure the use of them is in many cases detrimental to the welfare of our patients. A visual inspection of the bared chest, combined with a careful palpation of the cardiac area, will give far more information as to the condition of the heart than all the stethoscopes ever invented. And further, I go so far as to say that no man, however skilled he may be with his instrument, can form an opinion of a heart worthy of any consideration, who merely bases it upon an examination of the organ by the auscultatory method. The presence or absence of a murmur is often a very minor consideration; and it is well known that the intensity of a murmur is no measure of the amount of the disease. I do not say that the stethoscope is not a most useful adjunct to diagnosis in chronic heart disease, provided too much importance be not attached to the interpretation of the sounds heard. And in many acute cardiac affections auscultation is often the most reliable means we can employ for diagnosing the insidious mischief; but I do strongly condemn the practice, which seems to me to be an increasing one, of trusting entirely to the stethoscope, or one of its modifications, and using the information thus gained as a basis for treatment. Most forms of heart disease eventually create vicious circles. With a stenosed, or incompetent, mitral orifice, the lungs become engorged to relieve the back pressure. This chronic congestion of the lungs excites bron-

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chitis, which in itself, again, is a cause of pulmonary congestion. The liver likewise opens its flood-gates to relieve the right heart, and as a result, so congested will the portal circulation become, that ascites results, the presence of which, by the abdominal distension it produces, only further hampers the action of the already enfeebled heart, and diminishes the secreting activity of the intra-abdominal organs, more especially of the kidneys.

I have reminded you of these facts, because in our methods of treatment we are liable to concentrate our attention too much upon the heart itself, and to ignore certain other symptoms which are of the utmost significance. If ascites is present in great quantity, I am an advocate of early tapping in most cases. I am fully alive to the fact that we have powerful diuretics at our disposal in the shape of caffeine, digitalin, etc., to effect this purpose; but it often happens that we do not care to administer these in sufficient doses to produce the desired result, unless the patient is under constant supervision. Meanwhile all the abdominal organs are suffering, whereas a timely paracentesis gives immediate relief, and by subsequent dietetic and medicinal treatment we can often postpone indefinitely the re-accumulation of fluid.

Wet and dry cupping, and the application of leeches to the bases of the lungs, is a method of practice which is gradually coming into vogue again; and I must say has, in my opinion, much more to recommend it in these cases, and in certain allied conditions, than the practice of applying poultices, which only tend to draw more blood to the already engorged lungs.

One of the most valuable therapeutic remedies we have at our disposal in the treatment of chronic valvular disease is rest, though I fear we are sometimes led to rather neglect its value in our anxiety to meet the wishes of our patient. When we remember that the number of beats per minute is about ten less in the reclining than in the upright position, it is easily seen what an enormous saving of labour is effected for the heart during the twenty-four hours by acting upon this principle. I have recently had under my care a boy with bad mitral incompetence, with a greatly displaced apex-beat owing to ventral dilatation, whom I kept in bed for over two months, merely treating him the while on general principles, and it is surprising what benefit he has gained as a result. Whereas formerly he suffered a great deal from præcordial pain and dyspnœa on the slightest exertion, he can now walk about and enjoy life, never conscious of the fact that he has a heart. Without unduly frightening the patient who has chronic valvular disease, it is our duty, I think, to impress upon him the fact that he has henceforth to live down to his heart, and that if he will only constantly bear this in mind we can, in many cases, justly hold out to him a reasonable span of life. Having once brought about a condition of compensation, our next endeavour should be to try and keep it sustained. Towards this end a careful supervision and regulation of the daily exercise is of prime importance. Walking, cycling, and even horse exercise are all allowable if not abused. Golf may be countenanced in a few selected cases only, for, speaking generally, the muscular effort required for the "drive" in this game is liable to produce a sudden, and perhaps fatal, syncope. The patient should always be warned to cease from his exertion immediately he has the slightest distress in breathing, or feels any præcordial pain or "stitch" in the side. Light dumb-bell exercise with bells ½ to 1 lb. in weight is a most useful form of exercise for such patients; and better still are the graduated elastic exercises which can be obtained with the "Sandow" or other similar apparatus. Tonic doses, *i.e.* to say, ℥iij to ℥iv of the tincture of digitalis and strophanthus, combined perhaps with a few minims of the tincture of nux vomica, may often be taken with great benefit for several weeks on end. Flatulence, a very troublesome symptom often, is best controlled by a careful dietary, and by the administration of creosote or carbolic acid in perles after meals. The alvine secretions should receive very careful consideration, and an occasional five-grain "blue pill" usually gives more satisfaction in this matter than does any other form of aperient.

In the treatment of aortic disease, pure and simple, pain and mental anxiety are often the most prominent symptoms we have to deal with. For the one, iodides and nitrites give the most relief in my experience; for the other, opium may be quite legitimately given, and often with great

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benefit. Putting aside all theoretical considerations, I have never yet satisfied myself clinically that digitalis, or one of the allied group of drugs, is of benefit in this form of valvular disease; but rather do I prefer mercury, and that in the form of "blue pill."

The most unsatisfactory form of chronic heart disease to treat, is that associated with stenosis of the mitral valve. Such cases are most frequently seen in children and young adults, and, I should say, in females more often than in males, for some unexplained reason. It is the exception rather than the rule for a child with mitral stenosis to reach adult life, and even if she should reach maturity, she is usually of stunted growth and ill-developed. There is much to be said in favour of the congenital theory of this form of heart disease in young people. It is surprising how very constricted the mitral orifice may become before death or any very pronounced symptoms appear. I made a post-mortem examination on a woman the other day, who had a mitral orifice that would barely admit a penholder. Yet two minutes before her death she was sitting up in bed quite comfortable and free from all distress; and without any exertion, other than raising a drinking cup to her lips, she suddenly fell back never to regain consciousness. These cases do not respond to the cardiac tonics in the same satisfactory manner as do the cases of mitral insufficiency, and when we consider the nature of the lesion this is in part explained. Cases of this kind when seen for the first time, can often be diagnosed at sight by the intense lividity of the face and extremities; and instead of a feeble, irregular, frequent pulse, we find a small pulse of regular rhythm, and with a frequency perhaps of not more than 90 to 100 per minute. Yet such cases are usually of far more gravity than are the cases of mitral incompetency with a large amount of œdema, and an almost uncountable pulse. These cases of mitral stenosis usually exhibit signs and symptoms of considerable right-sided dilatation, and this we must try to relieve by some form of blood-letting. I am quite confident that I have on more than one occasion saved such a patient from immediate death by the timely application of a dozen leeches to the præcordium.

The treatment of chronic valvular disease in the young is not nearly so satisfactory as in those who have reached adult life. In the first place we have to remember that injured valves do not grow as do healthy valves; and in the second place we must bear in mind that although the heart has reached its normal maximum growth at the age of eighteen or nineteen years, yet in most cases the rest of the body continues to develop for several years longer. The effect of any very prolonged or severe physical exertion at this time of life, as is occasionally imposed upon soldiers, or voluntarily indulged in by cyclists or other young athletes, is at all times liable to be followed by serious consequences, and *a fortiori* in those already the subjects of valvular disease. The so-called cardiac tonics, again, do not produce their characteristic effects so markedly in children as in adults, and with each succeeding year of life more work is thrown upon the organ owing to the growth of the rest of the body; and as I have said before, we find as a matter of experience, that only a small percentage of children who have chronic valvular disease ever reach maturity.

Most chronic valvular affections are the sequel of some antecedent attack of acute endocarditis, of which rheumatism is by far the most common cause; and in prescribing a line of treatment for any particular case, we have always to bear in mind that a fresh exacerbation of rheumatic endocarditis, unassociated perhaps with any fresh joint trouble, and causing a slight rise in temperature only, is possibly the cause of the patient seeking further advice. The administration of such powerful drugs as digitalis or strophanthus in such a case would be most strongly contra-indicated, for to excite an already inflamed organ to increased activity of action is a contravention of all known laws based upon pathology; but rather would we treat such a case with absolute rest and a course of the salicylates. Take the case, again, of a man with chronic valvular disease, who for years has lived free from any symptoms referable to his heart. The time at length comes when he suffers from præcordial pain and dyspnœa, indicative probably only of the abuse of alcohol and tobacco.

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"SOME DIETETIC PROBLEMS."

THE PURVIS ORATION,

Delivered to the West Kent Medico-Chirurgical Society, December 7th, 1900,

By GEORGE VIVIAN POORE, M.D., F.R.C.P.,

Physician to University College Hospital; Professor of the Principles and Practice of Medicine, University College, London.

CHARLES LAMB in one of the most charming of his essays makes complaint of the man whose utterances are of too positive a kind. The West Kent Medico-Chirurgical Society will have no cause to pass a similar criticism on the Purvis Orator of this evening.

It is mainly because the "twilight of dubiety" has fallen upon me in regard to some dietetic problems, that I have selected that subject for my discourse. Some of the utterances on these questions which are found in text-books, and which appeal to the wayfarer from the hoardings in the streets, where the Fat Bulls of Bashan compass us in upon every side, are to my thinking of too positive a kind. They appear to me to be so, for I hold that nothing in this world makes entirely for good or entirely for evil, and that "Roses have thorns and silver fountains mud." At most we are only able to form a doubtful judgment as to whether the balance of effects makes for our benefit or the reverse.

The change which has taken place in the dietary of the British in the last two or three centuries is prodigious. The diet of our ancestors consisted mainly of meat (including fish and poultry) and bread and beer and wine and other fermented drinks made from honey. Even in the dietaries of kings and nobles fresh vegetables are seldom mentioned. Sugar and spices and dried fruits were luxuries, brought from "the Indies" for the tables of the rich, and except for occasional "pippins and cheese," fresh fruits were barely represented on the dinner table. In the bills of fare of William of Orange, I find mention of

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asparagus as an item served occasionally for His Majesty's dessert.

It is difficult for us to conceive a dietary of which tea, coffee, cocoa, sugar, and potatoes, formed no part, and into which fresh fruit and vegetables only occasionally entered. How the poor, living on bacon and salt meat, dried fish, bread and cheese, came through a severe winter, we can scarcely understand; nor can we wonder if occasionally they were tempted to go "in search of conies," or to cast covetous eyes on the fat deer in his lordship's park. It is scarcely open to doubt that the high mortality of these times and the frequent deaths from "the purples," the "bloody flux," and allied diseases which suggest a scorbutic habit of body, was due to the comparative absence of fresh meat and vegetables from the dietaries.

Fresh bread, good cheese, sound beer, and honey have each of them, probably, some anti-scorbutic power; but if the bread be stale or sour, the beer "turned," and the cheese rancid or mouldy, so that they create loathing instead of appetite, the peasants' condition becomes critical.

The gradual improvement in agriculture, especially the systematic use of "roots," such as turnips and mangels, for the winter sustenance of sheep and cattle, has made the procuring of fresh meat in the winter an easier matter. Concurrently the supply of human food has been improved by the horticulturists, who have made potatoes, carrots, turnips, ground artichokes, celery, spinach, onions, leeks, beet, and the whole tribe of cabbages available for our winter use.

More important still has been the effect of free trade and rapid transit. The best of everything the world supplies is to be had in our markets at a price against which the home-producer finds it difficult to compete. Bananas are almost as cheap as turnips; oranges may sometimes be bought at little more than a farthing each; while grapes and pine-apples have long ceased to be the exclusive luxuries of the wealthy. Imported animal food is equally plentiful, and it is as true to-day as it was in the days of Erasmus, that the masses of our population fare equally as well as the monarch.

There is every reason to think that the improved nutrition of the people has been the chief factor in that improvement in the public health which has been witnessed in the second half of the nineteenth century. There is no excuse now for that taint of scurvy which made the populations of the sixteenth and seventeenth centuries so vulnerable to disease; and the disappearance from among us of spotted fever, typhus and the purples is propably due to this cause. That immunity to zymotics is largely proportioned to the healthy nutrition of the people, is an assertion which may, I think, be safely accepted.

There are one or two facts which tend rather to check our optimism, and to suggest a questioning as to whether the suppression of epidemic disease tends to enhance the vigour of a race.

We are now confronted with the fact that the diminution of our birth rate, is tending to rather more than counterbalance the diminution of the death rate, and that an ever-increasing proportion of the population has to be partially or wholly maintained at the public expense. We may hesitate to call these assisted persons "paupers," but the fact remains.

The infants in our great cities are as delicate as ever, and in hot seasons succumb to dietetic disease in numbers which do not diminish. The pale and rickety are apparently as plentiful as they were twenty years ago. Our women, especially among the rich, are neglecting the sacred privilege of suckling, and are content to leave their offspring to the tender mercies of advertising tradesmen, who compare badly with the she-wolf that nurtured Romulus and Remus.

We have long recognised rickets as a dietetic disease, and in addition to rickets we have in recent years been taught by Barlow and Cheadle that very definite scurvy is not uncommon among infants who are artificially fed.

The increasing tendency to dental caries has been attributed, and probably with justice, to deficiencies in diet, and the ever-present dyspepsia, the scourge of all ages and both sexes, betokens a want of vigour for which dietetic errors are probably partly answerable. Again, while I am ready to give every credit to our improved powers of diagnosis, and to the greatly lessened dangers which anæsthetics and antiseptics have brought to abdominal operations, I cannot but feel that purulent collections within the abdomen are relatively more frequent than they used to be, and it seems certain that the human intestine is at least as vulnerable now to the infection of enteric or

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dysentery, as it was in former days. These are questions which one cannot dissociate from dietetics and nutrition. Nor must we refuse to consider in like relation our increased and steadily increasing susceptibility to malignant disease.

What we arbitrarily speak of as our advancing civilisation has brought the important question of the safe and effective "hand-feeding" of infants very much to the front, and very laudable efforts have been made, *first*, to discover the proportions in milks of a few complex ingredients, which the chemist is able to isolate and identify, and *secondly*, by artificial means, and often by the addition of materials which are not found in natural milks, to make the milk of the lower animals similar in composition to the milk of women.

But this is something more than a mere question of chemistry. It is a question of biological action; and it seems to me certain that in spite of infinite pains and skill, milk *in mamma* must always be something very different from milk *in vitro*.

Milk in the breast is a part of the living mother, just as the blood is, and like the blood it begins to undergo physical changes the instant it is drawn. The temperature falls, the fatty particles begin to separate, and if it be whipped or churned there is formed by a process still imperfectly understood that coagulum which is conventionally known as butter.

In a very little time, proportionate to the temperature of the air and the purity of its surroundings, it turns sour or putrid, and becomes unfit for human food, and is often dangerously polluted by the filthy ways, the carelessness, or the dishonesty of those through whose hands it passes on the way to the consumer.

To the suckling at its mother's breast, attached like a bud to the parent stock, the milk flows from the living cells of the mammary gland to the living stomach of the child without risk of contamination, without loss of temperature, without exposure to the air, without any separation of its constituent parts, without, in short, any of those physical changes which milk undergoes *in vitro*, and which make it progressively less digestible. It is probable that the composition of human milk varies, in accordance with season and diet as much as does the milk of cows, but this is a matter of small importance in comparison with the physical difference between the milk which comes direct from the mamma and the half-churned fluid which is sucked from a bottle through a rancid bit of india-rubber tubing.

I am inclined to the belief that milk becomes less and less suited for the nutrition of an infant in direct proportion to its remoteness in point of time from the mammary gland.

It is difficult very often to form a judgment on the effects produced by drugs or foods, because of the impossibility of getting away from the *post hoc* fallacy.

I find, however, that there is an absolute consensus of opinion among my obstetrical friends that children which are nursed at the breast do better than those which are hand-fed. My colleague, Dr. Herbert Spencer, in particular speaks most positively on that point. I am able to bring before you one case, which seems very full of instruction.

A medical friend of mine has had three children, and he has been good enough to place in my hands a record of the weights of these children for the first eleven weeks following birth.

The interest of the record consists in the fact that of these three children two were hand-fed, while the third has been nursed by its mother. They are all three boys, born in the same house, and in the midst of comfort and good hygiene. One experiment is not much, but the circumstances of this one seem to give it a special value. The father says "all were splendid chaps at birth," a statement which, with regard to the two first, I am able to corroborate.

	1 Hand-fed.	2 Hand-fed.	3 Nursed.
Weight at birth	8 lbs. 10½ oz. (138·5 oz.)	9 lbs. 1 oz. (145 oz.)	9 lbs. (144 oz.)
Weight at end of first fortnight	127·5 oz.	151·5 oz.	164 oz.
Weight at end of second fortnight	146·5 oz.	162·75 oz.	196·5 oz.
Weight at end of third fortnight	153 oz.	170·5 oz.	221 oz.
Weight at end of fourth fortnight	165·25 oz.	172·25 oz.	241 oz.
Weight at end of fifth fortnight	189·5 oz.	175 oz.	254·75 oz.
Weight at end of eleventh week	193·25 oz.	180 oz.	265·75 oz.
Percentage of increase from birth	33 per cent. nearly	25 per cent. nearly	84 per cent.

These figures speak for themselves, and show

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that the nursed child developed about three times as fast as the two which were hand-fed.

Absolutely fresh milk, while it is still warm from the animal, has always had a good repute for its nourishing power, and in history there are instances of aged people being kept alive by wet nurses. This is recorded of Dr. Caius, one of the early Presidents of the Royal College of Physicians and the founder of Caius College, Cambridge.

In November 21st, 1667, Pepys writes: "'With Creed to a Tavern.' On this occasion, Dr. Whistler (President of the Royal College of Physicians), told a pretty story, related by Muffet, a good author, of Dr. Caius that built Caius College; that being very old, and living only at that time upon woman's milk, he, while he fed upon the milk of an angry fretful woman, was so himself; and then being advised to take it of a good-natured, patient woman, he did become so beyond the common temper of his age."

Most of the proved and acknowledged dangers of milk, which are dangers inseparable from its manipulation, are abolished by bringing the consumer into direct contact with the producing animal and drinking it "hot from the cow."

There is still, I believe, a solitary cow in St. James' Park, to remind Londoners that their ancestors were believers in naturally warm milk; and if dairymen persist in the dangerous practice of adding preservatives and chemicals to the food of our infants, we may live to see the re-establishment of the old custom, or something like it.

The discovery has been made, important as we all admit, that the milk of cows having tuberculous udders may contain bacilli capable of infecting animals fed upon such milk; but whether or not this is a common channel of infection for human beings we have not sufficient evidence to show.

It is a matter of common knowledge, that in a herd of cows belonging to the best, and best-known family in the kingdom, thirty-eight out of forty cows were found to be tuberculous. Of this family four generations are living, and, no family is more free from the infection of tuberculosis. I do not doubt the correctness of the experiments in the matter of bovine tuberculosis, but we must all admit that the epidemiological link in the evidence as to the conveyance of tuberculosis by milk has yet to be found.

There are at least two diseases which are common to cows and human beings, viz. small-pox and tuberculosis. Why is it, I would ask, that at the present time in relation to human public health, the cow with small-pox is, as it were, at a premium, and the cow with tuberculosis at a discount?

It is greatly to be desired that our herds should be composed of healthy animals—in that we are all agreed,—but to advise that, because of the dangers of milk, all our infants are to be fed on sterilised milk or boiled milk instead of new milk, is to advise a rash experiment, all the more dangerous, as it seems to me, because the effects of such a practice will be difficult or impossible to estimate. It would be a leap in the dark—an arrogant rebuff to nature, who in such matters is, I believe, a tolerably safe guide.

And here I would take leave to remark that the interests of consumer and producer are not identical in this matter. If the dairyman be allowed to sterilise all his milk, and still to call it "new milk," he will be relieved of the danger of losses from his produce "going bad." But he will sell us old milk for the price of new milk. There is room here for liberty, and if sterilised milk be labelled and sold as such, its market value would soon be established.

So again the addition of antiseptics to milk or dairy produce ought to be stated on the label. Why should not milk and dairy produce to which chemicals are added be allowed to find its market value? Personally I regard them as worse than worthless, but I am aware that others hold a very different opinion. A fair market will settle that question. That antiseptics facilitate the trade of the vendor and increase his profits there is no doubt.

Let us have fair labels, and let us adhere to the motto "*caveat emptor.*"

Having made out what seems to me a fairly strong case in favour of new milk as against manipulated milk, let us turn our attention to the question of meat. In recent years we have had revealed to us the remarkable effects produced in certain individuals by feeding on the raw fresh thyroid gland of a sheep. The cretinous dwarf has been seen to grow four or five inches in a year, and to undergo an intellectual development on a par with the physical change. The sufferer from obesity sheds his fat while his pulse is quickened and the output of urea is increased. The

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sufferer from myxoedema regains her normal briskness and much of her natural comeliness, while hair may, in some cases, be seen to replace baldness, and the skin of the sufferer from psoriasis become again as the skin of a little child.

We have learnt that this potent medicine must be used with great caution, and we have further learnt that the thyroid gland, in order to produce its full effect, must be *fresh* and must *not* be *cooked*. The chemist can tell us very little as to the difference between cooked thyroid and raw thyroid, between fresh thyroid and old thyroid, and yet diatetically there is an enormous difference.

A fact of this kind seems to go far towards justifying the popular prejudice in favour of "underdone" meat, and the very general impression among doctors as to the value of raw meat in certain conditions of impaired nutrition. These dietetic problems are not susceptible of rigid proof, but most of us are agreed that the raw living oyster is a very digestible and stimulating food, and that a new-laid egg beaten up with new milk and taken raw is a food of great and acknowledged value. We are not much given in this country to the consumption of uncooked meat, but I would remind you that in many parts of the world meat which has been slightly salted and dried has a great reputation for its nutritive and stimulating qualities. Beef may be bought in London under the name of hung beef or Hamburg beef which has been thus treated, and which is enjoyed by many, and is easily digested. In Germany, hams and some forms of sausage are eaten without being cooked, and the stimulating quality of the food is said to outweigh the slight extra risk of trichinosis. Among the advantages which the Boers have had over us in South Africa must be reckoned the very portable sun-dried food called "biltong." This, I believe, should, correctly speaking, be made of the loin muscles of a deer. Biltong made from the ox appears to be equally valuable. With a piece of biltong attached to the saddle, and a knife to cut it, the commissariat department is at once simple and effective. I have met English officers who were loud in praise of biltong as a war ration.

In hot, dry countries sun dried, uncooked meat is much used by those who spend long hours in the saddle.

In a moist climate like England the preservation of dried meats is not to be done without great care.

It may be well to direct attention to the fact that certain beasts which feed but seldom, such as snakes, will not eat dead food, but only consume animals which they kill themselves. It is interesting also to observe how domestic carnivora, such as cats and dogs, when burdened with the cares of a family, will often prowl about in search of living prey. When I see my cat incessantly stalking sparrows and making excursions for mice to an inordinate extent, I know that she has a litter of kittens, and I have also observed the same propensity in a brooding bitch.

These facts have induced me to carry out some experiments, or rather to ask my friend and former pupil, Dr. Thiele, to carry out some experiments for me, on the relative digestibility of meat under the three conditions in which we know it, viz:—(*a*) Immediately after death, before rigor sets in; (*b*) during rigor, and (*c*) after rigor, when the meat has become tender again.

The result of these experiments so far has been to show that in the usual mixture of HCl and pepsin in one and a half hours the ante-rigor meat proves 25 per cent more digestible than meat which has entered into rigor. The post-rigor meat is not more digestible than the meat in rigor. The ease with which the muscle-fibre undergoes peptonisation before rigor seems to furnish a justification for the conduct of carnivora which hunt their prey. Man very seldom consumes meat before the advent of rigor, never, probably, except when eating oysters. An officer just returned from Africa, who takes a most intelligent interest in these important dietetic questions, told me that he was present on an occasion when some deer got surrounded by a regiment of our men, and were shot down, skinned, and eaten then and there before the onset of rigor. He said they were very good eating, and were much enjoyed as a change from tough draught ox and "bully beef."

The flesh of the coursed hare is said to be much appreciated by epicures, and the reason given is that rigor has passed off before the animal is eaten. On the other hand, I am told that hunted stag is "horrid to eat," because "the fat gets all mixed up with the meat in some way." The contrast between the hunted hare and the hunted stag is, if corroborated, interesting, and seems worthy of attention. I have no personal experience in the matter. The hare is an animal which carries no fat

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The chemist can tell us very little as to the difference between muscles in a condition of ante-rigor, rigor, and post-rigor, and yet we find that their solubility in digestive fluids differs considerably. We practically never eat meat except in a condition of rigor or post-rigor, when it is relatively indigestible. When a joint of fresh meat is "hung" in a pure place, it ripens and gets tender and delicious before putridity sets in. We have no certain knowledge as to the cause of this "ripening," and one naturally asks, "Is it microbial? Has the joint of meat served as a cultivating medium for a vegetable growth of which the products are pleasing to the palate?" The ripening of meat does not, if one may judge by the palate, take place in the ice-chest, nor is it possible when it comes out. Some of us are, I think, too ready to judge of the nutritive qualities of food by looking at the chemical analysis. We forget that it is not that which we put into our mouths which nourishes us, but that which we digest and absorb.

Digestion depends upon the condition of the digestive organs, and these are stimulated to activity by the sensory nerves of the mouth, tongue, palate, nose, and eye. Our appreciations of different kinds of food vary with the individual. In this, as in all other matters, no two of us are alike. As digestion depends upon the degree to which the flow of secretion from the alimentary tract is stimulated by our sensory nerves, we may fairly conclude that the food which is eaten with appetite and liking is more useful than that which we swallow as a duty, but with loathing, loathing so great that sometimes the stomach instantly rejects its contents. We cannot, happily, get away from that inscrutable craving called appetite—a craving which surely guides the sane man to a selection of food which is suitable for him, and further prompts him to that change of diet which appears to be essential for our well-being.

Lind ('A Treatise on the Scurvy,' page 78) says: "Our appetites, if they are not depraved, are upon this and many other occasions the most faithful monitors, and point out the quality of such food as is suited to our digestive organs, and to the state and condition of the body. For where there is a disposition to the scurvy from a long continuance in the moist sea-air, concurring with a glutinous and too solid diet, nature points out the remedy. In such a situation the ignorant sailor and the learned physician will equally long with the most craving anxiety for green vegetables and the fresh fruits of the earth, from which only relief can be had. Such people, in the height of the disease, not only employ their thoughts all day long in satisfying this unfortunate demand of nature, but are apt to have their deluded fancies tantalised in sleep, with the agreeable ideas of feasting upon them at (*sic*) land."

Lind, in addition to lemons, fresh vegetables, oranges, pickles, sauerkraut, etc., advocates the use of fresh *fermented* bread and *fermented* drinks, such as cider, beer, spruce beer, and wine (such as Malaga and home-made wines). Spirits he considers bad for the scurvy, and when used must have some lemon juice or a slice of lemon added. One of the best ways is to give lemon with Malaga. Sugar and molasses, added to wine to start fermentation afresh, are advocated.

With the growth of our cities, it becomes increasingly difficult to supply our populations with really fresh food. In London we seldom eat fish in really fine condition. The refrigerator enables us to get it free from putrefactive changes, but few Londoners have ever eaten fish in that crisp, curdy condition which it is in when fresh caught. In the present year I have twice visited Newcastle, and have been much struck by the excellence of the fish, due, as I was informed, to the fact that the fishing smacks unload in what is almost the centre of the town. The fish are not only fresh, but new-caught. There is the same kind of difference between fish which have been for days in a refrigerator and new-caught fish that there is between new-laid eggs and "shop" eggs.

The difference between fresh vegetables and those which have been a day or so on a greengrocer's stall is admitted by most of us. Few persons, however, who have not a garden of their own know the flavour of really new-gathered vegetables. Asparagus, peas, beans, and even cabbages, which are taken direct from the garden to the pot, have a flavour which can, and ought to be, appreciated.

While on the subject of new-gathered food, allusion may be made to the great and deserved popularity of those vegetables which we habitually eat raw, such as ripe fruits, lettuce, endive and other salads, watercress, celery, and, among the poor, especially, onions and garlic.

How much some of these vegetables lose by

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cooking is best seen in the onion, which after cooking is but a shadow of its former self. We must include butter and cheese among the foods which are habitually taken raw, and of whose highly nutritive qualities one can have no doubt. It is obvious that modern cheap substitutes for butter and cheese belong to an entirely different class.

I have thus far offered you a good deal of evidence that many foods are more valuable raw than cooked, and more valuable new than old. The nutritive value of a food is proportioned to its digestibility and its power to stimulate appetite and digestive secretions. Apart from such considerations mere chemical analysis is worthless, and I must confess that personally I am in no way converted to the belief that meat which has been refrigerated is at all the equal of new meat which has been hung. Refrigerator meat is often sold without warning; and I am rather repelled by joints which are deficient in fat; in which the cellular tissue shrinks upon the bones, like the jacket of a growing schoolboy on his arms; in which the first cut sometimes lets out a spirt of watery fluid; in which the fibres gape; and the meat is tasteless and flabby, and very often not done in the centre. Such a joint is to a really fresh joint what a "shop egg" is to one which is new laid.

I am quite ready to admit that refrigerated meat is better than putrid meat; I am aware that there are those who state that it is *better* than fresh meat. Nevertheless, I am of opinion that every carcass of meat should bear upon it the date of slaughtering.

A week or two since I walked through a village street near London on a Saturday night.

The grocer's shops were piled from floor to ceiling with tinned provisions; most of the butcher's shops were hung with joints shiny with moisture or absolutely dripping, showing that they were fresh from the refrigerator; and the vendors of fried fish were busy in putting flabby blue soddden-looking stuff into boiling oil, and making a fume which drifted for a quarter of a mile down wind. It is needless to say that a refrigerator is a famous invention for vendors, who are thereby enabled to keep food for a good market, and are never compelled to sell hurriedly at "an alarming sacrifice."

The question whether this old food has the same value as fresh food is one which it is difficult to answer, but in the present state of our ignorance there ought to be no risk of our mistaking the one for the other. In the same way "tasteless antiseptics," such as boric acid, ought not to be added to food unless the fact be clearly stated. It is surely as dangerous to keep a baby too exclusively on pickled milk as it is to keep a sailor too exclusively on pickled pork.

We are as yet quite ignorant of the *vera causa* of the scurvy, which seems to make its appearance when persons are deprived of *fresh* food. No chemical theory as yet put forward has afforded an adequate explanation. With fresh vegetables, and to a less extent with fresh recently killed meat, scurvy may be warded off, but apparently it is not to be warded off by tinned provisions, nor even by lime-juice which has been kept too long.

Lind's advocacy of fermented foods, such as beer and bread, is interesting, and that leads me to say that to speak of beer as an "alcoholic" food, and to gauge its value or the reverse by its percentage of contained alcohol is a mistake. Beer is the fresh product of a cultivation of a species of saccharomyces in an infusion of malt, just as bread is the product of an allied fungus growing in dough. Alcohol and starch, *per se*, have no antiscorbutic power, but beer and bread, which result from fresh vegetable growths, are both of them credited with the power of keeping off scurvy.

In the same way butter and cheese are both of them the products of microbic growth upon certain milk products. Cheese is at its best when it is thoroughly "ripe," but it must be regarded as fresh food to the end, because it is the ever-growing microbe and its products which really constitute the attractive features of cheese.

We have given conventional names to certain products without reference to chemistry.

Butter is a dairy produce which takes some days to make. Attempts have been made to hurry the process by rapidly separating the cream by means of machinery. "Separated" cream will furnish a very edible grease of uniform quality, but it has never fallen to my lot to eat a really fine sample of butter (judged by flavour) which has been made with "separated" cream.

Nature refuses to be hurried, and it remains to be seen whether the various "ripeners" (*i.e.* pure

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cultivations of microbes) will bestow the true flavour upon "separated" butter. Margarine has no resemblance on the palate to fresh butter, and is not in any sense a fresh food. To my thinking it is inferior in flavour to good dripping.

What is true of butter is true of cheese, and imitations of cheese hurriedly made with the aid of fat and chemicals ought to be marked.

The ripening of food such as hams, bacon, wine, and even spirits is probably a biological process.

Attempts have been made to make "temperance" drinks without having recourse to fermentation, by artificially "charging" mixtures of syrup and flavourings with carbonic acid. It is very interesting to see how singularly the attempt has failed, and how in the summer the demand is everywhere for "stone bottle ginger beer" (*i. e.* fermented) in preference for the imitation article. I lately tasted an imitation ginger beer which was a thin liquor, very sweet, and which made one sneeze. At a guess I thought it was a mixture of water, saccharin, and formic aldehyde charged with carbonic acid.

It is singular, but I think true, that liquids which effervesce as the result of fermentation, and those which are "charged" with carbonic, taste quite differently, and, moreover, the effervescence of fermentation is far more persistent. The practice of "charging" the cheap effervescent wines and bottled beers is one which ought to be watched. In the same way aërated bread and fermented bread cannot be mistaken for each other. From my point of view the former is not "bread" in the true conventional sense. Baking powders produce an aëration of farinaceous food very different from fermentation, and not acceptable to all of us.

The chemist is showing very great ingenuity in imitating Nature, and in furnishing "synthetic products," which are often made from manufacturers' "waste." We have a right to demand that these imitation foods should be clearly labelled. We should then soon arrive at their true market value; and we must not allow old food, whether refrigerated or pickled, to be sold for new food, and the mixing of chemical products with natural products should be absolutely forbidden unless it be fairly stated on the label.

CLINICAL REMARKS

ON A CASE OF

RHEUMATOID ARTHRITIS WITH MITRAL DISEASE

Shown at the Medical Graduates' College and Polyclinic,

By C. O. HAWTHORNE, M.D., M.R.C.P.,

Assistant Physician to the Royal Hospital for Children and Women, London; Physician to the Central London Ophthalmic Hospital.

GENTLEMEN,—The main feature of interest in the patient I now submit to you arises from the relationship which the case possesses to a much-debated question, viz., whether the disease which is marked by certain deformities of the joints, and is known by such names as rheumatoid arthritis, osteo-arthritis, and rheumatic gout, is or is not a form of rheumatism. The roots of the controversy to which I now allude may be traced back into somewhat ancient history. There was a time when the diagnosis of affections of the joints was a matter of extreme simplicity, for they were all placed in one and the same category, and had one and the same label, viz. Arthritis. Towards the end of the sixteenth century the term Rheumatism began to be applied to affections of the joints, and very shortly after this Gout was recognised as distinct from rheumatism, a diagnostic advance which is specially associated with the name of Sydenham. From that time until the present day there has been a growing tendency to mark off joint affections into specific groups, and in this way to restrict the application of the term rheumatism within narrower and narrower limits. Thus we have such diseases as pyæmic arthritis, gonorrhœal arthritis, traumatic arthritis, and the joint affections which may accompany hæmophilia, syphilis, scarlet fever, locomotor ataxy, etc., each of these groups being recognised, at least by most authorities, as due neither to the influence which causes gout, nor to the influence which causes rheumatism. The question whether rheumatoid arthritis also is to be separated from gout on the one hand and from rheumatism on the other, is less readily answered, or perhaps it should be said that the question produces directly contradictory answers from different authorities. It would be easy to quote well-known names both on

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one side and on the other. But it is sufficient here to remind you that whilst we have one school of physicians asserting that rheumatoid arthritis is merely a form of chronic rheumatism, we have another school maintaining that whatever be the nature of rheumatoid arthritis it is certainly not rheumatism, and only within the last few months we have been told by an authority of the highest eminence that there is no such thing as chronic rheumatism. The majority of those who maintain the non-rheumatic nature of rheumatoid arthritis regard the disease as the result of changes, either primary or induced by reflex irritation, in the nervous system; according to this theory, therefore, the deformities of the joints are the results of trophic disturbances. Another view is that the disease is due to a special micro-organism, though no one goes so far as to assert that the proof of this is at present complete. With these secondary questions, however, the facts of the present case are hardly concerned. It is in connection with the primary question whether rheumatoid arthritis is or is not a form of rheumatism that I wish you to examine the patient. Let me make one more remark about that question. Obviously before it can be properly debated we must define our terms, and must agree upon the meaning to be attached to the word "rheumatism." To secure a definition for the word is, however, not easy. But whatever differences may exist on other points, everybody will agree that rheumatic fever is rheumatism. Therefore the dispute we are concerned with means—if it means anything—Are the changes in the joints in rheumatoid arthritis, and the polyarthritis of acute rheumatism, due to the same or to different agents? In the present state of our knowledge it seems to me impossible to answer that question with any degree of confidence; and I am not venturing to suggest, even for a moment, that the evidence provided by the present case is sufficient to justify a definite answer. But I do submit that the phenomena which our present patient exhibits are of such a nature that they should make us cautious in giving in our adhesion to the fashionable doctrine that rheumatoid arthritis is a non-rheumatic disease. For myself, I am prepared neither to affirm nor to deny that rheumatoid arthritis is rheumatism. The facts of the situation seem to me to demand a suspense of judgment. And the present patient provides, I think, an illustration of the need for hesitation before deciding that in rheumatism and rheumatoid arthritis we are dealing with two distinct and different diseases. The reason why such an influence may be claimed for the case is shortly this: The patient exhibits one set of facts which, taken alone, would be recognised as distinctive of rheumatoid arthritis, and a second set of facts which, viewed separately, would be regarded as almost conclusive evidence of rheumatism. The joint conditions, in a word, are those of rheumatoid arthritis, but associated with them there are the signs of endocarditis affecting the mitral valve, a condition which, when occurring in a young woman, is almost diagnostic of rheumatism and which, it is urged by those who are most ardent in defining the disease as non-rheumatic, does not occur in rheumatoid arthritis.

Let us now look at the facts of the case. The patient is a young woman of twenty years. During the last four years she has on four occasions had a fairly sharp attack of pain affecting both her feet and her right hand. The pain has never been so severe as to confine her to bed, and she has never had any condition described as rheumatic fever, nor has she had St. Vitus's dance. She has come to the hospital because, during the last twelve months or so, she has been troubled with breathlessness on exertion, and because, as she puts it, the attacks of pain have left swellings of her right knuckles and of the root of her thumb, and have deformed her toes. It is important to observe particularly the conditions of the joints to which she draws attention. As you see (Fig. 1), the heads of the second and third metacarpal bones of the right hand are considerably enlarged, and on the dorsal aspect of the base of the first is a firm bony elevation which projects in a somewhat beak-shaped process towards the carpus, thus preventing the thumb from reaching a full measure of extension. The heads of the metatarsal bones (Fig. 2), especially of the first one, on each side, are much enlarged, and there is a high degree of deflection outward of their phalanges. Now it is of course common enough to hear of children and adolescents having one or more rheumatic attacks with no more pain than that from which our present patient has suffered.

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And in such cases it is not unusual to find that while the rheumatic influence has treated the joints very leniently, it has, by causing endocarditis, produced permanent valvular disease of the heart. Had this girl, therefore, told us her story, and had we found, as we actually do find, the existence of mitral disease (auricular-systolic and ventricular-systolic murmurs at the apex) with little or no change in the tissues of the joints, we should simply have said that this is one of the numerous cases in which rheumatism in early life falls most heavily upon the endocardium. But we have in our patient not only to deal with a history of joint pains and the presence of endocarditis. We have, in addition, to take note of actual changes in the structures of certain joints. And these changes, I submit, are those described as distinctive of rheumatoid arthritis. The enlargement of the heads of the metacarpal bones, the bony nodosity found near the base of the first metacarpal, the state of the metatarsal bones, and the position of their phalanges—these are events which are common enough in middle-aged and elderly people who are the subjects of chronic rheumatoid arthritis. The peculiarity in the present case is that such conditions should have developed in a girl whose history is identical with that given by many young patients who, complaining of subacute attacks of pain in various joints, and being found to be the subjects of cardiac valvular disease, are readily recognised as victims of rheumatism. In support of the contention that the joint conditions here are those claimed as distinctive of rheumatoid arthritis, it may be further pointed out that the site of the disease is in the small joints, that the changes have commenced in the peripheral articulations of the limbs, and that, in the feet at all events, there is marked bilateral symmetry in the deformities produced. Further, as is readily appreciated in the

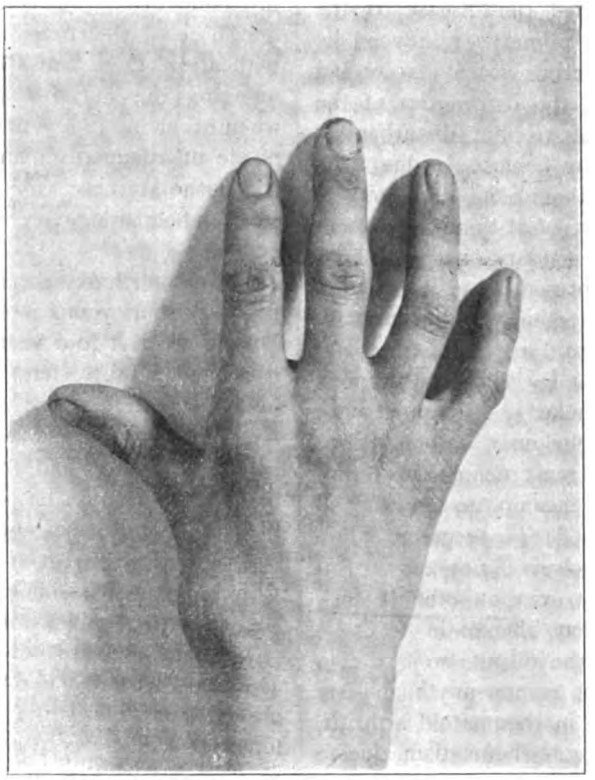

FIG. 1.—Showing enlargement of the heads of the second and third metacarpal bones, and the presence of a considerable thickening at the base of the first metacapal bone.

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right abductor indicis, there is a distinct degree of muscular atrophy. These conditions, I repeat, are exactly those occurring in so-called characteristic cases of rheumatoid arthritis. Especially would I ask your attention in this respect to the enlargement of the heads of the metacarpals and metatarsals, and to the bony mass at the base of the first right metacarpal. There can, I take it, be little doubt that if attention is confined solely to the condition of the joints, the case must be labelled as one of rheumatoid arthritis. But, as you can readily verify, our patient has organic mitral disease. She has at some time or other in her life been the subject of endocarditis. And endocarditis, though a very frequent evidence of rheumatism, more especially in early life, is not, we are told, an event included within the history of rheumatoid arthritis. You will, indeed, find it stated that the absence of cardiac valvular disease from cases of rheumatoid arthritis is conclusive proof that there is an essential pathological difference between that disease and rheumatism. If this doctrine is to be accepted, we must conclude—the joint conditions being what we have seen them to be—that our present patient is the victim of two distinct and different diseases, one of which has deformed her joints, and the other the curtains of her mitral valve. No one can deny that such is a possible explanation of the facts. And a history of scarlet fever when she was five years of age might be urged as an occasion not unlikely to account for the endocarditis. On the other hand, it is at least equally reasonable to regard the two sets of facts—the cardiac and the articular—as the products of one and the same influence. And all the more so when it is remembered that certain observers who have enjoyed a large field for the study of joint affections have insisted upon the view that rheumatoid arthritis

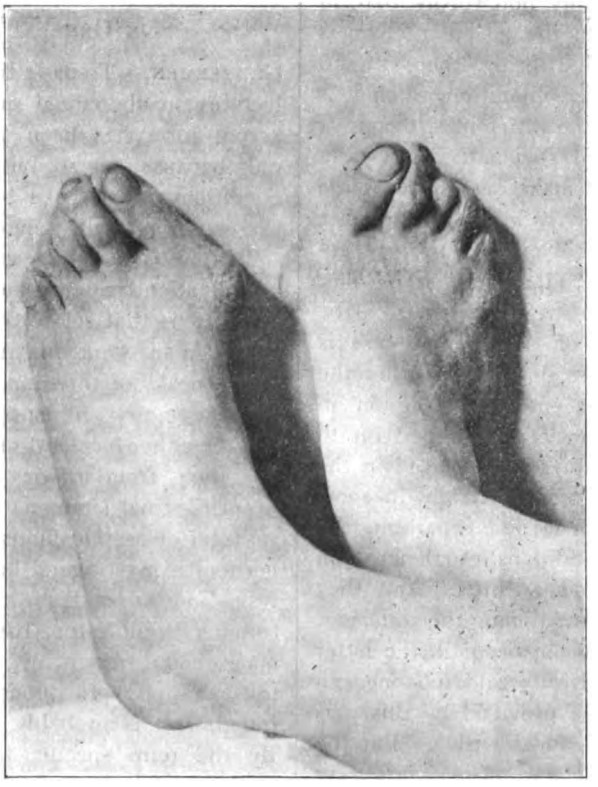

FIG. 2.—Showing enlargement of the heads of the metatarsal bones, and displacement outwards of their phalanges.

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is simply rheumatism and nothing more. In this connection it may be remarked that such a view was held and taught by Charcot, in whose experience cardiac lesions were not uncommon in the affection which he regarded merely as a nodular or progressive form of chronic articular rheumatism. It is in the light of such a statement that the present case seems worthy of careful observation and reflection. There is, it must be admitted, a weak link in the chain of argument so far as our immediate patient is concerned. But it is certainly noteworthy that in a young patient in whom the articular changes are those of rheumatoid arthritis, there should be found to exist a cardiac condition which it is frequently said helps in the differential diagnosis between that disease and rheumatism. Such a state of matters may well make one pause before giving adhesion to the theory which teaches that rheumatism and rheumatoid arthritis are two entirely distinct diseases. The question is not, Are they so? but rather, Are they proved to be so? And the tendency of the present case is to show that it is at least doubtful whether the possible existence of an endocardial lesion in one and not in the other can be relied on to establish this proof. The facts displayed in the case show how difficult it is—certainly in some cases—to draw a firm clinical line separating the history and articular conditions of rheumatism from those of rheumatoid arthritis. And they adduce some reason for questioning the statement that cardiac affections do not occur in the latter condition. As I have already said, no one can contend that the evidence provided by this particular case is conclusive and decisive. But the association of facts which it offers bears very decidedly upon an interesting and not unimportant controversy, and suggests the line of thought which I have endeavoured to submit to you. Thus the case seems to me one of great interest, and I have therefore ventured to occupy your time in defining some of the controversial questions which it raises.

CLINICAL LECTURES

ON

THE VARIOUS FORMS OF INTRA-ABDOMINAL SUPPURATION.

Delivered at Westminster Hospital,

By A. H. TUBBY, M.S., F.R.C.S.,

Surgeon to the Hospital.

LECTURE VII.

On General Peritonitis.

Gentlemen,—To-day's is the last of our series of lectures on abdominal suppuration and the most severe form has been reserved until now, not only because it is so, but because the other local conditions which have been dwelt on are often the causes of acute septic and diffuse peritonitis.

Peritonitis is a disease decidedly difficult of classification, and the most inclusive table of its varieties is that set forth by the late Mr. Greig Smith, in his work on 'Abdominal Surgery.' He there speaks of three main kinds of peritonitis—simple, septic, and specific. The simple form may be either localised or diffuse, and arises from operation, from injuries to the abdominal wall, from intestinal strangulation, and from the extravasation of aseptic fluids. The septic variety of peritonitis may, again, be either localised or diffuse, and arises from the introduction of pus-forming bacilli, from the intestine, from the female genital organs, or it may be traced directly to operation. In tubercular peritonitis pus is found, and is probably due to mixed infection. By the term specific peritonitis is meant the gouty, syphilitic, and albuminuric forms. It is important to grasp these facts, that a simple and traumatic peritonitis may develop into a septic type, and a localised inflammation may always become generalised.

In septic peritonitis, what are the pathogenic micro-organisms? The most usual forms are the *Bacillus coli communis*, and almost always associated with it, are the *Staphylococcus pyogenes aureus* and *albus*. It has been fully shown that in the case of the appendix the *Bacillus coli communis* can diffuse through the walls of the diseased or damaged intestinal tract and set up an acute septic peritonitis.

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This point cannot be too strongly insisted on, namely, that all classifications are only aids to memory, and should not be too much dwelt upon from a clinical point of view, because it is impossible to differentiate precisely, and at all times, one form from another, *e. g.* a patient may have simple peritonitis in one part of the abdominal cavity and suppurative in another part. But for the sake of description we are compelled to classify them rigidly. One of the first things you will have to learn in practice is that the tables of varieties cannot be applied to all cases. We have now to consider the questions, How do patients die of peritonitis? and Why is it that peritonitis is such a fatal disease? Patients die in one of three ways. Peritonitis may be fatal from want of phagocytosis, when there is not sufficient formation of leucocytes and plasma-cells to form on the peritoneal surface a barrier against the septic products, which are therefore rapidly absorbed and poison the patient. Peritonitis may, on the other hand, be fatal, not on account of the absence of phagocytosis, but because of the large number of leucocytes and plasma-cells which are poured out, and die in their effort to deal with the virulent material, and so produce a large amount of pus. There is also the nervous element as a cause of death in acute peritonitis. From the peritoneum strong reflex actions are readily set up. If a few drops of very septic fluid from the stomach after a meal, or the contents of a suppurating gall-bladder are effused into the peritoneal cavity, the patient becomes collapsed and shortly presents the appearance of a man who has received a violent blow in the epigastric region, or taken a deadly poison.

As to the *signs* and *symptoms;* I propose to exclude those of specific peritonitis, that is to say, the gouty, syphilitic, alcoholic, and those due to Bright's disease, etc., and to speak of those proper to the septic form. There is no one certain sign of peritonitis. Many, like them of old, always seek for a sign, and especially cardinal signs, yet there are very few diseases which have such. It is the judgment of the relative value of signs at any given moment that makes the diagnostician. If called to the bedside of a man who is presenting the symptoms of profound abdominal collapse, the trained diagnostician will probably be able to say that general peritonitis is present, but he is often unable to determine its cause at once. Mr. Treves has well summed up the appearance of the patient with acute peritonitis, and describes it as that of a poisoned man, in fact, as if he had had a large dose of arsenic. He lies collapsed, with a feeble pulse, sighing respiration, drawn pallid features, perspiration on the face, flexed limbs, and is totally unable to move. You will see the picture of the poisoned man more intensified towards the close of the illness than at the beginning.

We may take the signs in their order of occurrence. Vomiting is a fairly constant symptom, but it is of a peculiar character. It is not so profuse as in strangulation of the bowel, when the man belches up large quantities of intestinal contents. The man with peritonitis has eructations of gas, and then a little fluid comes, but there is no sudden gush of vomit. Tympanites may be well marked, and it is often so in those cases in which the condition has existed for some time. But in the very worst cases there is no tympanites at all, and it is important to be aware of this. What are the causes of tympanites? It is partly due to a paralysis of the bowel. You will ask at once, why it is a man has paralysis of the bowel in acute general peritonitis? It is mainly on account of the poisoning of the nerve-endings in the muscle, which therefore fails to contract, and the gas in the intestines causes rapid distension of the intestinal walls. Tympanites also partly arises from mere mechanical obstruction. For instance, if a portion of the intestine is bound down by a band, such as occurs in acute intestinal obstruction, you will find that the intestine becomes rapidly distended, because the intestinal gas cannot pass away.

Pain is often present, but as a symptom is of uncertain value. The most severe cases often have no pain towards the end, and some few of them do not have any pain at all. I have, in a previous lecture, quoted a case reported by Mr. Treves, in which the patient, although very ill from appendicitis, smacked the region of the iliac fossa and declared he felt no pain there. As a rule, when perforation of a hollow viscus occurs, the pain is for a time intense. It is worst about the umbilicus, but after a time it becomes somewhat localised at the site of commencing peritonitis, and early in the illness there is con-

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siderable local rigidity of the abdominal muscles.

Constipation is generally present in peritonitis, although exceptionally diarrhœa is present. If the latter should be the case at the beginning of acute general peritonitis, the disease is almost always of the virulent type, and it is extremely likely to become suppurative. Constipation may be produced by opiates, and diarrhœa by purgatives. Pyrexia is a most variable symptom. All the worst cases have a subnormal temperature. As I have remarked, if there be a rapid pulse, a subnormal temperature, and a history of abdominal trouble, you must be on your guard, for you may know that you are in for one of the worst types of cases, in which prompt action is absolutely necessary.

The general systemic symptoms are well known, such as a low muttering delirium, rapid and wiry pulse, and feeble heart. The face is drawn, the extremities are cold, and there are extreme thirst and great diminution of urine.

The question of *prognosis* depends, first of all, on the cause, that is to say, if a hollow viscus is perforated the peritonitis is more likely to be fatal than when the peritonitis arises from another cause. Then it also depends upon how soon after the onset of the attack the patient is seen by a surgeon, and how soon an operation is done. It has been clearly shown that a large percentage of cases of gastric ulcer recover if they are operated on within the first twenty-four hours. I had a very successful case some time ago in one of the suburbs of London, in which perforation occurred at 3 a.m. on a Friday; the medical man in attendance was a very acute man, and suspected that perforation of the stomach had occurred. At 5 p.m. he detected that the liver dulness had disappeared. On operating at 10 p.m. the position of the ulcer could be felt on the anterior surface of the stomach, and it was of the size of a five-shilling piece. It had five doubtful spots on it, and from one of these spots gastric contents were issuing, and the other four looked as if they were on the point of perforating. It was not possible to invert the floor of the ulcer on account of its size, so a piece of omentum was grafted on, and the patient recovered, practically without a bad symptom. Another case was in Percy Ward. It was that of a girl who had had perforation for three days. I operated upon her and grafted omentum in the same way. She went on apparently well until the twenty-third day, and then she died of hæmorrhage from another ulcer which had not been detected at the time of the operation. One may say in all cases of suspected perforation of a hollow viscus, operated at once and quickly. Slowness in operation means failure.

The only *treatment* is to open the abdomen, preferably in the middle line, and be guided by the escape of fluid or gas. If the fluid be fæcal, examine the ileo-cæcal region, because it may come from the appendix or from perforation of the cæcum or obstruction of the colon, giving rise to sloughing of the cæcum and exudation of fæcal matter. If nothing is found here and the cæcum be distended, examine the sigmoid and rectum, thereby excluding mechanical obstruction. Finally, examine the stomach and duodenum. There is nothing more difficult than to find a perforating ulcer on the posterior surface of the duodenum. If the perforation has been found, and the surgeon has been able to close it (I do not think you will fully realise what that statement means until you have had some experience in trying to do so), there are other matters to attend to. You should relieve the distended and paralysed intestines. Then get the septic fluid out of the abdomen, and finally obtain good drainage.

To relieve the paralysed intestine, if the contents are gaseous, or mainly so, you may make multiple punctures of the intestine, using a small needle, so that the opening closes at once as soon as the gas has escaped. If the distension is due to fluid you should put in a fine trocar. When it is removed close the opening by careful suture. If there are large coils of distended intestine you should draw them outside, and make a small incision into the intestine to evacuate the contents, and then close the opening. But if, in the course of your operation, you meet a gangrenous patch of intestine, and there is no time for resection, your best way is to empty the intestine and then insert a Paul's tube. If you find the peritonitis is chiefly of the plastic variety, with but little pus, you evacuate what pus is present and take the greatest care not to disturb the adhesions, because that would mean shock in the first

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place, and hæmorrhage later. Therefore, in plastic peritonitis do not do more than is necessary at the time. With regard to the septic foci, if they are localised you drain very carefully after you have irrigated the septic cavities, and then put in a drainage-tube.

As to irrigation, it is not to be done by a fire hose or a glass syringe, but with hydrostatic pressure. The source of pressure should not be more than twelve to eighteen inches above the abdominal cavity. You merely want sufficient force for the fluid to find its way into the various interstices, but not to rupture the adhesions which may have formed or do other local damage. When you have irrigated, take care to sponge away the remaining fluid. As a rule the fluid residue collects in the pelvis, and therefore the pelvis requires draining by means of a Keith's tube. If you have reason to believe that the amount of septic fluid left behind is small, you may put in a gauze drain over the top of the pubes into the pelvis. This should not be left in more than twenty-four hours, because granulations grow into the meshes of the gauze, and pulling it out is extremely painful to the patient, and may produce profuse hæmorrhage. A glass drain is preferable, because it does not give rise to irritation.

As to *after-treatment*, there is one measure I have the greatest faith in myself. It was initiated by the late Mr. Lawson Tait, who was a man of original mind, and one who had the courage of his convictions. It is that in all these cases of abdominal operations a saline purge should be given on the third day. The result is very remarkable. A patient may be in considerable distress, both mental and physical, but after he has had a good evacuation of the bowels he gets better immediately. Opiates should always be avoided except to relieve excessive pain.

This, Gentlemen, is the end of my attempt to bring before you some interesting affections connected with suppuration in the abdominal cavity.

THE growing fashion of relying on colomel in the treatment of some forms of ascites and anasarca has created a demand for this drug in the convenient form of the "Tabloid," and we have received from Messrs. Burroughs Wellcome & Co., a sample of calomel prepared in this portable and serviceable manner; each tabloid representing a dose of three grains.

SOME CASES DEMONSTRATED AT THE MEDICAL GRADUATES' COLLEGE AND POLYCLINIC.

By JONATHAN HUTCHINSON, F.R.C.S., F.R.S.

Here is an infant with a congenital swelling on the chest, a large tumour on the front of the mammary region, and a smaller one on the lower end of the inner side of the arm. One of them is red and inflamed and the other not. It is a congenital form of cystic nævus. It is vascular and contains fluid, and there are veins in it which are cut off from the rest. Here is one which is no longer sponge-like, but contains a great deal of fibrous tissue and irregular loculi. It is a very well-recognised form of the congenital tumours, which are destined to run their course, to inflame, and then to become obliterated; but they do not usually appear so early as this in the child's life. Children are generally from four to six months old when they have them. Sometimes they are very severe and dangerous, involving the limb as if it would be gangrenous, and it may make the child very ill. It never suppurates, however, and eventually disappears. I have seen a good many cases. I saw one involving the thigh, in which amputation of the hip-joint was talked of; however, by the use of spirit and lead lotions it was made to disappear. We learn that the child was born at full term. The tumours feel flabby to the fingers, and are rather worm-like; where it is inflamed it is distinctly hard. Though these tumours look as if they will suppurate, they do not actually do so. Now as to inherited syphilis: the child has got erythema over the whole of the surface. Erythematous conditions in young children are not very uncommon, especially with such inflammation as this. Erysipelas might also occur. The case is one of a very interesting form of vascular tumour allied to nævus, sometimes attended by real nævus of the skin. This has undergone changes converting part into fibrous tissue and part into cysts. One sometimes sees very large ones on the side of the trunk. There is nothing in the case or in the mother to bear out the least suspicion of syphilis.

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Here we have a baby with epispadias (ectropion vesicæ). There is separation of the bone at the pubic symphisis, and a complete cleft of the whole of the dorsum of the penis, separating the penis into two halves, the separation extending to the bladder, but there is scarcely any part of the bladder left. The ureters are very much dilated. It is a very interesting and typical example of the affection. In some cases the defect goes deeper. There is no evidence of congenital syphilis in the case. Now and then it does occur in a case of congenital syphilis. The causes of the defect are unknown, and it must begin very early in fœtal life. The umbilicus is involved in it. Sometimes only the symphisis pubis will be affected, the two recti muscles being separated from each other, and the bladder prolapsed beneath the defective parts. It may go to various depths. Here it has gone sufficiently far to destroy the penis and front of the bladder, and if it had gone still further it might have divided the bladder into two posteriorly. To be more correct I should say that the worst type of the affection is where the parts of the bladder have never united. Some believe that there is some causal relation between this condition and congenital syphilis. Congenital syphilis may be present in such cases now and then, but I deny any distinct connection between the two. Nor do I know of any other special disturbance of nutrition which would account for it. It is more common in boys than in girls.

Some will be asking me about treatment. My late friend, Professor Wood, of King's College Hospital, devoted a great deal of attention to this subject, and another older friend, McWhinnie of St. Bartholomew's Hospital, gave a great deal of attention to it. Many operations have been done for it—operations of genius, and persevering operations,—with the object of covering the bladder with transplanted skin. I am insisting upon the point that the bladder is not there. If there were a good hard bladder, one might hope, by covering it, that the patient might gain some sort of control. But the anterior parts of the bladder are deficient, which is a very great drawback to any prospect of good results from operations. It is not an operation I have had anything to do with myself. Some triumphs have been gained in it by great perseverance, but there have been a great number of failures and disappointments. At the best it is but a partial result which is gained. Failing that operation, Mr. McWhinnie devoted his ingenuity to the construction of apparatus fitted in front of the patient to receive the urine. These cases go about with incontinence of urine all their lives. As far as my individual experience goes, I recommend the use of apparatus rather than any form of operation. Very often you can see the orifices of the ureters quite easily, because they are very much enlarged. The converse condition, hypospadias, is very common, while epispadias is comparatively rare. Hypospadias may be of very different degrees, but epispadias is generally complete, and dates from birth.

The Treatment of Loss of Hair.—(1) Loss of hair is far more frequent among men than among women. (2) Neither the unmarried nor the married condition exerts any influence on the hair. (3) Intellectual occupations, especially when combined with worry and nervous strain, are predisposing if not exciting causes of baldness. (4) Sixty-six per cent. of the cases of loss of hair begin before the thirtieth year of age. If one passes that age without showing signs of loss of hair his chances for keeping his hair are much increased, as is represented by 36, 17, and 9 for the three following decades. (5) In women general thinning of the hair is the most common form, while the receding temple is uncommon. In men the whole top of the head is most often affected, and the receding temple is very common. (6) The great predisposing cause of loss of hair is heredity, 132 of the 300 cases showing a well-marked family history. Next to heredity all disorders of the general nutrition of the body are predisposing causes. The greatest exciting cause of loss of hair is dandruff, a term used to include seborrhea sicca, pityriasis, seborrheal eczema or dermatitis—72⅔ per cent. The evil influence o dandruff is greatest in those of a bad family history of loss of hair. As to treatment, the best drugs are sulphur, resorcin, and the mercurials, in the order in which they are named. The only stimulant to the hair worth mentioning is massage, and this should not be employed until the dandruff is checked.—*Therapeutic Gaz.*, Dec., 1900.

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SOME REMARKS ON HERNIA, ITS CAUSATION AND TREATMENT.

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GENTLEMEN,—Let us first consider the mechanical conditions of the abdomen. Roughly we may regard it as composed of a surrounding envelope or wall of muscle and tendon, including the contents, which are the several viscera. When a protrusion of the contents through any portion of the surrounding wall occurs, whether temporarily or permanently, it is called a hernia. If it takes place through the anus or the vagina, it is described as a prolapse or an intussusception.

A prolapse is for all practical purposes a hernia. In the normal subject the resisting power of the abdominal wall bears such a mechanical relationship to the pressure exerted by the contents which it surrounds and encloses, that under average conditions they remain inside the wall, whose integrity is complete. In the normal subject the abdominal wall is weaker in certain places than it is elsewhere. For instance, for a time after birth the umbilical cicatrix and the unobliterated process of peritoneum accompanying the cord or round ligament are places where the contents may protrude outwards under the influence of excessive tension. The necessity for the existence of a passage for the spermatic cord and for the round ligament through the wall renders the channel in which they are contained relatively insecure.

The crural canal and ring form another weak spot in the surrounding wall.

If the vigorous adult is engaged in any occupation necessitating the exposure of the contents of the abdomen to a pressure greater than the surrounding wall can sustain, the contents escape outwards, usually through the inguinal canal. Some laborious pursuits favour this more than others. Perhaps the employees in gas works who feed the fires suffer as much as any, since in the position they assume constantly while at work the

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inguinal canal is placed at the greatest mechanical disadvantage. Such labourers would be well advised to supplement the resisting power of the abdominal wall in the situation of the inguinal canal by the habitual use of a suitable truss. In this manner a very frequent considerable mechanical and financial depreciation consequent on this form of labour may be readily avoided.

Perhaps we can best study the various modes in which the intra-abdominal tension exceeds the resisting power of the weakest portion of the abdominal wall by examining the conditions which lead to the development of a hernia from infancy to old age.

In infancy the normal mechanical relationship between the abdominal wall and the structures enclosed in it is very easily upset by the abundant formation of gases in the intestinal tract, and of fluid in the peritoneal cavity, both of which are consequent upon the too frequent administration of the mother's milk, or upon the use of improper foods.* This condition of flatulent distension is popularly spoken of as "wind." Its influence upon the surrounding wall is to stretch it, the abdomen losing the characteristic round form and firm resiliency of the healthy child. It is bulged laterally, and the tendinous interval between the recti is stretched to a varying degree. The most marked feature is the alteration in form the abdomen undergoes when powerful expulsion efforts are made. The temporary protrusion of the viscera in the middle line may be so great as to deserve the name of hernia.

The cicatrising umbilicus yields rapidly, forming a thimble shaped protrusion, which is very conspicuous during expulsive efforts. If the child be held suspended in the erect posture, the presence of peritoneal fluid as well as bowel may often be recognised in the sac.

The fluid is also readily forced along the imperfectly obliterated processus vaginalis, producing a hydrocele of the tunica vaginalis, and sometimes an encysted hydrocele of the cord, or fluid may pass along the canal of Nuck.

Bowel, with or without fluid, may also be driven into the unobliterated process of peritoneum, or it may enter and pass through the inguinal canal stretching the peritoneum, making a new serous covering for itself.

In adult life the factor that tends to drive the viscera through the inguinal canal is contraction of the abdominal wall, exerting a pressure on the contents of the abdomen greater than the inguinal canal can sustain. Such violent efforts may be made in lifting a heavy weight, or in straining violently to expel fæces, or in coughing. The condition may be developed on a single occasion, and this is especially the case when bowel is driven into an unobliterated vaginal process. But more commonly the process is a gradual one, the bowel entering the canal, and proceeding along it, and finally passing out through the external abdominal ring into the scrotum.

In either of these circumstances the contents of the hernia, whether bowel or omentum, or both, are liable to become strangulated, and the mode in which the bowel reacts to the strangulation varies in a marked manner in the two conditions. The variation depends on the character of the constriction. In a hernia into the unobliterated peritoneal process, the constriction results from the presence of a sharp, hard diaphragm, which corresponds to the position of the internal abdominal ring, and represents the mode in which the vaginal process of peritoneum is being normally obliterated at this point. In the slowly acquired variety, the constricting medium usually corresponds to the junction of the sac with the abdominal cavity, called the neck of the sac, and is broad and smooth.

In the case of the sharp constriction, the period of congestion of the strangulated knuckle consequent on the interference with the backflow of blood from it is brief, for the reason that the mucous and muscular coats of the bowel become thinned by the pressure of the sharp peritoneal edge upon them, and in this way a space is provided which allows the passage of blood along the veins. The mucous and muscular coats ulcerate rapidly along the line of compression, and nothing but the peritoneal coat may remain, while the appearance of the loop of bowel enclosed in the sac may present no abnormal degree of congestion. In such cases the operator should be careful to withdraw the bowel from the abdomen for a sufficient distance to enable him to examine the line of constriction, and if he finds the muscular and

* "The Causation and Treatment of Hydrocele and Hernia in Young Infants," British Medical Association, August, 1893.

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mucous coats destroyed to a dangerous extent, he can invaginate the line of ulceration by a series of Lembert's sutures.

On the other hand, when the constriction is broad, the obstacle to the backflow of blood not only does not diminish, but is steadily increased, owing to the engorgement and inflammation of the strangulated portion. Such a loop presents quite a different appearance to the last, being swollen, thick, and leathery, and most livid at the portion furthest from the constriction. The bowel at the seat of constriction presents no such ulcerative changes as those just described, but looks fairly normal, its nutrition being hardly if at all impaired by the pressure it has been subjected to. In this condition, if the engorgement be excessive, the whole loop must be excised, and continuity of the bowel above and below the constriction established by whatever means the operator prefers. I called attention to these states of strangulated bowel varying with the character of the constriction in a paper read before the Clinical Society in 1892.* A knowledge of them has proved of great service to me on many occasions in operations for strangulated hernia.

In the adult female subject the weak spot in the abdominal wall is the femoral ring and canal, and bowel may be forced through it by the sudden increase in intra-abdominal pressure from violent muscular exertion on one or many occasions, or by the more gradual increase produced by the development of the uterus in pregnancy, or by the growth of an ovarian, or uterine, or other bulky form of tumour, or by the presence of peritoneal effusion.

The presence of fat in the viscera increases the intra-abdominal tension in proportion to the amount present, while its development in and between the muscle-planes reduces the resisting capacity of the abdominal wall, and tends largely to the formation of a hernia. In obese subjects the region of the umbilicus especially, and the greater part of the linea alba are rendered insecure and their resisting power diminished by the deposit of fat, and hernia in these situations is in consequence comparatively common. They usually have their intra-abdominal tension still further increased by considerable accumulation of fæces and flatus.

We are apt to assume that in the treatment of a reducible hernia only two questions arise, namely, can it be treated with a truss? and, is it necessary or advisable to operate on it? To formulate a correct plan of treatment we must first consider carefully the causes that, in the first instance, disturbed the balance of the equilibrium between the abdominal wall and its contents and lead to the yielding of the former, and if they still exist as active agents they must be met also.

For instance, in infancy the first and very frequently the only treatment requisite, is to attend carefully to the feeding of the patient, in order to restore the natural mechanical relationship between the viscera and their surrounding wall. It may be necessary to supplement this treatment by such pressure exerted constantly upon the extruded viscera or fluid, as may be sufficient to keep them in the abdominal cavity. At an early age the exercise of the requisite amount of pressure is frequently followed by the establishment of organisms in the badly-nourished skin, whose vitality is still further depreciated by it, producing an eczematous condition. In the poor the treatment, both by dieting and by the use of trusses, is usually most unsatisfactory, and even in the children of well-to-do parents great difficulties arise, since the feeding is often relegated to servants, and the use of a truss, even if it is made to fit in the first instance, is, for one reason or another, rarely effective for any period of time. Fortunately as the child gets older the trouble in feeding satisfactorily diminishes and later disappears, the intra-abdominal pressure is no longer excessive and the altered shape and increased size of the child, and its more cleanly habits render it a less complex problem to keep the viscera in the abdomen than it was earlier in life. The chief difficulty the surgeon experiences is in ensuring that the bowel shall not escape from the abdomen into the shrinking sac, and so undo, by its temporary pressure, the good that has been done by the use of the truss for a long time previously.

Passing on to the consideration of inguinal hernia in adult life, resulting from exercise or an excessive strain by the abdominal wall upon the contained structures, it is too often assumed that

* "Cases Illustrating the Modes in which a Strangulated Loop of Bowel reacts to the constricting Medium," 'Trans. Clin. Soc.,' vol. xxv.

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the function of a truss is merely palliative, in that it serves to keep the bowel, etc., within the abdomen, and that the truss exerts no curative function.

If the factor which determined, in the first instance, the development of the hernia, whether it was force exerted on a single occasion or frequently repeated, be no longer present as an active agent, it is clear that if one can permanently remove from the interior of the sac the pressure of its contents which was originally responsible for its formation, and which, by its continued action, alone keeps it in existence, the sac together with its connection with the abdomen will atrophy and shrink up precisely as does the obliterated funicular process at an earlier period of life, under the same influence.

Therefore a truss should be fitted with the most perfect accuracy, and extreme caution should be adopted that no extrusion, however trivial or temporary, should be allowed to occur. In these cases it is much wiser to employ a rigid encircling loop of metal fitting accurately and comfortably with a pad, so applied that while it exerts no constant pressure it affords a solid and effective resistance during any expulsive effort. The most perfect method of applying pressure would be afforded by welding on a rigid apparatus of this sort, which could not be removed or its function interfered with by the patient and which would be continuously effective for a long period of time.

When fat, constipation, bronchitis, stricture, etc., become factors in the development of a hernia they must be treated actively and thoroughly, and their influence as active agents removed or reduced to a minimum, whether the surgeon determines to keep the bowel in the abdomen by means of a truss or by an operation.

When a so-called radical cure has been performed a truss should always be worn afterwards, if the factors which originally produced the hernia remain in existence. Should they no longer continue present a truss need not be used after the operation wound is firmly healed. For instance, in such operations undertaken in young life, after the child has ceased to suffer from indigestion, when the flatulence, etc., associated with it have disappeared, a truss is not required; but in adult patients, who have to return to their laborious pursuits often very soon after the operations have been performed, a suitable truss should always be worn afterwards when they are engaged at work.

Many surgeons would seem to believe that the performance of a radical cure upon an inguinal hernia renders it impossible for the same mechanical factors to produce a protrusion of the bowel again in this situation. This is, however, contrary to reason and to the experience I have had of the results of my own operations and of those of other surgeons, which came under my observation in large numbers during the several years I held the post of Surgeon to the National Truss Society.

A large proportion of these patients in whom the hernia had reappeared after an operation assured me that they were promised that *it would cure them of their trouble and would render it unnecessary for a truss to be worn subsequently*; most of them were engaged in laborious pursuits, and the fact of their having to appeal to a charitable institution for help, shows that in all probability they did not leave very luxurious lives. I point this out particularly, as there seems to be a widespread misunderstanding amongst operating surgeons as to the exact amount of benefit the patient derives from their treatment, and the effect of the operation upon the mechanics of the abdomen.

Atrophic Kidney in Childhood.— Klages reviews the literature of the subject, and reports a case of granular atrophic nephritis occurring in a boy of twelve years. He had always been well, with the exception of an attack of scarlatina at the age of three years; whether or not there was a complicating nephritis at that time could not be ascertained. Eight years later hæmorrhagic nephritis developed suddenly and ran a subacute course. The heart became hypertrophied, and there was marked accentuation of the second sound. A connection with the scarlet fever attack cannot be excluded, and the process was probably primary at that time, becoming chronic later. It is possible that primary atrophic nephritis occurs in childhood, but it is rare. Far oftener the process follows a pre-existing primary nephritis of infectious origin.—*Der Kinderarzt*, vol. xv.

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THE PREPARATIONS BEFORE ABDOMINAL OPERATIONS.

A Post-Graduate Lecture delivered at the West London Hospital,

By L. A. BIDWELL, F.R.C.S.,
Senior Assistant Surgeon to the Hospital, and Dean of the Post-Graduate College.

GENTLEMEN,—In this lecture I shall particularly refer to operations on the stomach, as they may justly be considered as the operations on the abdomen which require the most care. At the end of the lecture I will briefly point out any differences in the preparation of patients for other abdominal operations.

Under this title is included not only the preparation of the patient, but also that of the operation room, of the instruments, sponges, etc., and lastly, of the surgeon himself.

With regard to the preparation of the room in which an abdominal operation is to be done, surgical opinion has undergone many changes during the last few years. At one time it was considered essential that every abdominal case should be operated on in a special ward, and much was urged in favour of special hospitals for the purpose. These precautions were unnecessary, and now it is quite unusual for an operation to be performed elsewhere than in the ordinary operating theatre. There is much to be said, too, in favour of operating in the theatre instead of in a special ward, since the former always has a better light, is better ventilated, and has provision for onlookers. It often happened in a private ward that the entire area was insufficient for proper ventilation, even when the surgeon, assistant, and nurses only were present, and the air was positively pernicious when one or two visitors also were admitted. Another objection, too, against operation in the room in which the patient is to stay is that the smell of ether, etc., remains in the room for some considerable time; and the removal of tables, instruments, etc., after the operation, and the necessary cleaning of the floor, etc. occasions noise, and may disturb the patient. These remarks do not apply to the ideal operating rooms which have been added to some rich hospitals. An ideal room should be high up in the building, and should have an open outlook; its floor should be impermeable to moisture,—either of mosaic or marble; the walls should be of porcelain, or highly enamelled; there should be no ledges or crevices where dust can collect; the junctions between the wall and the floor and ceiling should be rounded off, so as to facilitate cleaning. The ventilation is of great importance; proper provision should be made for the admission of pure warmed air, and for the extraction of the vitiated air without the production of draughts. The light should be by means of windows looking north, and by a skylight. The room itself should be large, since it has to contain a number of people, and windows should be opened without unduly lowering the temperature.

Such a room, alas! is not within the reach of many institutions.

The point, however, of more practical importance is the selection of a suitable room for an operation in a private house. It should be a large bright room, with a south aspect, capable of being well warmed and ventilated without placing the patient in a draught. A room which is not usually used as a bedroom is preferable to one in ordinary use. The floor should be covered with linoleum, and the walls, if possible, with a washing paper, the ceiling being whitewashed. All curtains, carpets, and ornaments, pictures, etc., should be removed from the room some days before; it is better to remove wardrobes and chests of drawers, so as to avoid the risk of dust being created when these are opened. The floor, walls, paintwork, etc., should also be washed over with carbolic, if possible, two days before the operation.

If an operation has to be undertaken in a hurry, and the preparation cannot be made some hours before, it is better to omit moving any furniture, so as to avoid disturbing the dust. It is a great convenience to choose a room which communicates with another one, since not only is greater quietude ensured, by the nurse and servants entering another room, but it enables the washstand and other necessary articles of furniture to be removed. It is almost unnecessary to add that no food should be kept in the room.

The temperature of the room is of great im portance, since it is very essential to prevent any unnecessary lowering of the patient's body-heat; this is a most important factor in preventing shock. Between 75° and 80° F. is the best temperature during the operation. It is not pleasant for the

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surgeon and onlookers, but is best for the patient.

The operation table also deserves notice; in a hospital the ordinary table will be used, and when possible it should be made of enamelled iron, with either an enamelled iron or glass top. It should be 6 ft. 6 in. long, and from 3 ft. to 3 ft. 4 in. in height, since a low table is fatiguing to the operator; it should be fitted with some arrangement for being heated by hot water, and a mechanism to enable the Trendelenburg's position to be maintained, but does not require any other mechanism. This position can be carried out by having a light-jointed iron frame, with enamel iron fixed at the lower end of the table, and capable of being fixed at one of two points near the centre of the table, so as to form a double inclined plane. A table which answers every purpose can be made out of a framework of gaspipes with rounded feet, with a top (which should be two feet wide) in the form of a trough about three inches deep. Over this trough a cap-shaped top of iron or copper is fitted, the trough itself being filled with hot water when necessary, or some specially make flat hot-water tins can be fitted into the top. The whole table is enamelled. Over the top of the table are placed a pair of cushions made of compressed cork covered with oil skin, which can be readily disinfected by antiseptics.

Over the cushions a sterilised sheet should be placed, but no blanket, since the hairs of the blanket will stick to the covering of the cork cushions. In a private house it is practically necessary to use a blanket for the patient to lie on, as a mattress is quite out of the question. It is unnecessary to add that the blanket must not have been used on a bed, but must be new, or obtained direct from the cleaners; it should be covered by mackintosh sheeting, over which a sterilised sheet is applied.

Two other tables are required at the operation, one for the surgeon's instruments, and one for the sponges and basins of antiseptic lotion. These tables at a hospital should be of enamelled iron with glass tops, and in private should be prepared by being scrubbed all over, first with soap and water, and afterwards with 1 in 20 carbolic solution; the tops of each should be covered with a mackintosh, over which is placed a sterilised towel. Some provision is also to be made for the apparatus of the anæsthetist, but this does not call for special preparation.

Arrangement of the operation room.—As before stated, every unnecessary article of furniture should be taken out, and the bed should be placed in a part of the room furthest away from where the operation table is placed. The table should be placed with its foot three or four feet from the window, and should never be placed sideways or parallel to the window, since a sidelight is useless for stomach surgery. The surgeon stands on the right side of the patient, and his table is at his right hand, so that a required instrument can be reached with the right hand without stretching over the left. The chief assistant stands opposite to the surgeon, and the table for sponges and lotions is placed just behind and to his left, so that he can easily reach the bowl of sponges. When two assistants are required the second stands at the operator's left. The anæsthetist stands or sits at the head of the table.

About six good-sized bowls are required for an operation; they should be of glass, porcelain, or enamelled iron, and must be properly prepared before use. The mere rinsing them with 1 in 20 carbolic solution is quite inefficient in hospital work, since the solution will not remove caked blood or pus, but it may be considered to be sufficient in a private house. On the surgeon's table one bowl or tray should be prepared for the instruments, one for the ligatures and sutures, and a third for an antiseptic solution for the surgeon's hands. On the other table one bowl should contain antiseptic solution for the assistant's hands, and the others should contain the sponges and sterilised saline solution for washing them out.

A considerable number of towels are required to surround the seat of operation; and in hospital practice, at any rate, these should be sterilised by steam, since mere soaking in 1 in 20 carbolic solution is not sufficient to render them sterile. A simple way of sterilising is to boil them in a potato steamer for twenty minutes, and then place them in 1 in 40 carbolic acid solution. Care must be taken to unfold the towels before sterilising, otherwise the folded part will not get affected by the steam.

In the preparation of instruments boiling is now universally employed; if no special apparatus is at hand an ordinary saucepan will answer. There

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are two points to pay attention to in boiling instruments; the first is to let the water boil for some minutes before introducing the instruments, so as to drive off all the air; and, secondly, to add some ordinary washing soda (in the proportion of a teaspoonful to a pint) to the water; these two precautions will prevent the instruments from becoming rusty by boiling. There is some difference of opinion as to whether knives should be boiled, since it undoubtedly affects the cutting edge; the injurious effect can be reduced to a minimum by wrapping the knife in cotton-wool. Needles should always be boiled, since it is very difficult otherwise to sterilise their eyes.

After sterilisation by heat the instruments may either be placed in the tray ready for use, or if prepared at home for an operation at a patient's house, they should be placed in a sterilised metal case, or in a sterilised stout linen or holland bag to be carried to the operation. I have some envelope-shaped bags made which answer the purpose well; they are sterilised after being used and kept in an air-tight box. Others simply wrap their instruments in a clean towel, but unless this has been sterilised it may be open to risk.

Most surgeons prefer to put their instruments before use into some antiseptic solution, a weak carbolic solution being most popular. Personally I prefer a 1 in 60 carbolic solution; nothing stronger than this should be used, since the peritoneum would be injured by introducing strong carbolic lotion. To absolutely prevent injury to the peritoneum some surgeons use their instruments dry, or put them in sterilised normal saline solution; the latter method is, of course, ideal, but does not prevent the growth of any bacteria which may fall into it, or have settled on the instruments. Dry instruments are inconvenient when they have been once used, since blood will become clotted on them.

The needles to be used for intestinal and gastric suture deserve special mention; they should be round sewing needles, since the ordinary surgical one has too much of a cutting edge, and so inflicts an unnecessary amount of damage on the delicate intestinal wall. Both full-curved and straight needles will be required; the former can be obtained from an instrument maker, but the latter are best obtained from an ordinary haberdasher at a trifling cost; the best sizes are Nos. 7 and 8. For straight needles I always use those known as "calyx-eyed." They have a patent eye, which can be threaded by simply looping the silk over the head of the needle and drawing it downwards. This is of great importance when using wet silk and a fine needle with a small eye.

In order to save valuable time, it is most important that all the needles which are likely to be required should be threaded before the operation; in the case of the calyx-eyed variety this can be done in a few minutes even with wet sterilised silk, but it will be found almost impossible to thread the small curved needles with wet silk, so it is usual to thread them with fine dry silk before sterilisation, and then place both needle and silk into boiling water for twenty minutes. Before any anastomosis I require eighteen straight needles, and from six to twelve curved needles to be ready threaded with sterilised silk.

Sponges.—The preparation of sponges or of the materials to be used in their place is of prime importance. For intra-abdominal work it is necessary to use some material, particles of which will not be left behind in the abdominal cavity, thus ordinary cotton wool made into swabs should never be employed. Marine sponges, if properly prepared, are the best, but some surgeons employ sponge cloths, or wool swabs wrapped and tied up in gauze, both of which must be sterilised by heat before use. The thorough preparation of sponges is of so much importance, that in serious cases it should be undertaken by the surgeon himself, and not entrusted to others; personally I would never use the sponges prepared in a shop for an operation on the stomach.

The sponge should be first carefully selected. It is best to have one or two large flat sponges to cover exposed viscera, two or three small flat ones to pack round the part, and finally six or a dozen round sponges for swabbing. They should be soft, of very fine texture, elastic, and compressible.

There are several methods of preparing them; I shall refer to three.

In the first method the sponges are freed from sand by frequent washing in water, then placed in water which is changed twice daily for a week. They are then placed in a dilute solution of hydrochloric acid, in which they remain for three or four days; this dissolves out the remainder of sand and shell; they are then washed in frequent changes of

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water, and are placed in a strong solution of washing soda for twenty-four hours. This solution should contain one pound of washing soda for every twelve sponges; they are then washed in frequent changes of water, and either dried by heat, or put in a glass jar containing 1 in 20 carbolic solution.

The second method is recommended by Lockwood. First thoroughly beat and shake them to remove the sand, then soak for twenty-four hours in a solution of hydrochloric acid in water (one drachm to the pint), which will remove bits of coral and shell. They are then washed in boiled water which has been allowed to cool to 100° F. in a covered vessel; from this they are placed in a warm solution of washing sodo (3i to Oi water), and are allowed to remain for half an hour to remove fat and albumin; they are then washed out in warm sterilised water, and put into a cold solution of sulphurous acid (1 in 5) for twelve hours. This insures sterilisation and bleaching. A plate should be placed over the sponges to keep them at the bottom of the receptacle during bleaching, so as to prevent discolorisation.

They are then washed out in sterilised water, and squeezed as dry as possible, after which they are placed in 1 in 20 carbolic solution, and remain there until they are wanted. When required for intra-abdominal use, care should be taken to remove the carbolic acid, which is best effected by wringing the sponges out in sterilised saline solution.

The next method is Borham's method, and this is specially recommended for cleaning sponges after use. The sponges, after removal of sand by washing, are soaked in a 1 per cent. solution of permanganate of potash, which is afterwards washed out by repeated washing and squeezing. They are then placed in a disinfecting fluid, which is prepared by dissolving half a pound of sodium hyposulphite in a gallon of water, and adding four ounces of oxalic acid; sulphur dioxide is then formed in the meshes of the sponges, and acts as a powerful disinfectant, as well as bleaching and removing fibrin. The sponges should not be allowed to remain longer than ten minutes in this solution lest they should become rotten. They are then washed out thoroughly in several changes of water, and are either dried, or put into 1 in 20 carbolic solution to remain till required. This method takes much less time than the former.

Another simple and usual method of cleaning sponges, which have not been used for any septic cases, is to first thoroughly wash out in plain water, then soak in several changes of soda solution for a couple of days, after which the soda is thoroughly washed out in water, and the sponge squeezed dry and put in 1 in 20 carbolic solution.

Ligatures, etc.—Of even more importance than the preparation of sponges and instruments is the insurance of absolute asepsis in ligatures which are to remain in the wound. Here, again, I should never leave inside the abdomen a ligature or suture prepared at a shop, and I consider it only right to prepare them myself, or have them done under my own superintendence. The materials employed for ligatures in abdominal surgery are silk and catgut, and for sutures, silkworm gut, horsehair, or even fine wire.

The best silk is that known as Chinese twist, and can be obtained in sizes ranging from o.o.o. to 6; the two finest sizes are used for ligatures of small vessels and for intestinal suture, No. 1 or 2 for sutures of the abdominal wall, and the larger sizes for ligatures of pedicles, etc.

The only reliable method of preparing silk is by boiling for some considerable time, and it is also essential to unwind the silk before doing this, otherwise the central part of the hank would not be sterilised. It is best to wind a small amount on a small glass reel or on a glass microscopic slide, and so only sterilise about the quantity which will be needed for each operation; there is always a certain risk in using a reel of silk for a second operation unless it be sterilised again and with the finest silks boiling more than twice will probably make them rotten. I prefer to boil my silks for at least half an hour in Lister's strong antiseptic solution (a solution containing 1 in 20 carbolic acid, and 1 in 1000 of perchloride of mercury); they are then placed in 1 in 20 carbolic solution until required for use, when they must be placed in a very dilute antiseptic if they are to be used for intra-abdominal work. Silk should never be boiled in soda solution with the instruments, since it is thereby rendered rotten. As ligatures may be weakened in preparation, it is important before beginning a continuous intestinal suture to test the strength of the silk. Horsehair and silkworm

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gut do not require to be boiled before use, prolonged soaking in 1 in 20 carbolic solution is all that is required.

With regard to catgut, although I have not personally employed it in abdominal surgery and do not recommend its use, still many surgeons do not reject it. I will therefore briefly refer to two methods of its preparation. The first is Esmarch's method, which consists in first vigorously scrubbing ordinary commercial catgut with soft soap and a brush; after washing in water it is wound on glass reels or slides, and then placed in a 1 in 100 solution of perchloride of mercury for twelve hours. It is then put in a 1 in 200 solution of perchloride of mercury in alcohol for another twelve hours and preserved dry in closely-stoppered bottles. Before use it is laid in a solution of 1 in 2000 of perchloride of mercury in alcohol. This method, according to Lockwood, produces sterile catgut.

The other method consists in the application of heat, and, since catgut cannot be boiled in water without being ruined, Mayo Robson has advised sterilisation in xylol, which is kept at the temperature of boiling water for half an hour. A special metal cylinder with a screw top is required. The catgut is loosely wound on a reel or slide, and sufficient xylol is placed in the cylinder to cover the catgut; the top is then screwed down, and the cylinder is placed in a saucepan of cold water, which is gradually brought up to the boil and allowed to remain boiling for half an hour. The catgut is then removed and kept in 1 in 20 carbolic solution or in alcohol. A similar method, using alcohol for xylol, has been recommended by Jellett.

(To be concluded.)

Varicella Eruption.—Starck details two cases in which the eruption of varicella was much more marked over the chest than over the rest of the body, owing to the fact that an empyema dressing in one case, and a Priessnitz bandage for pneumonia in the other, had irritated the skin in that region before the attack of varicella developed. The distribution of the rash is not only dependent upon the intensity of the infection, but also upon the tenderness of the skin itself and upon certain external influences.—*American Journ. of Obstet.*, Dec., 1900.

SLEEPLESSNESS IN HEART DISEASE AND ITS TREATMENT.

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INABILITY to sleep must always be regarded as a most significant symptom, and in every instance, should demand careful consideration before any line of treatment is adopted. In heart disease this is especially important, because the heart is deprived by sleeplessness of that amount of rest which it enjoys under healthy conditions as a consequence of the natural slowing of its action during sleep. If therefore sleeplessness persists in a person whose heart is diseased, it may not only produce failure of compensation, but seriously increase any such failure that may exist.

The causes of sleeplessness may be divided into nervous and vascular. It is probable, however, that the large majority of cases have, strictly speaking, a vascular origin, the nervous system being then in a condition of anæmia, hyperæmia (active or passive), or toxæmia, according to the nature of the case; for, although physiologists differ as to the exact cause of sleep, clinical experience teaches us that any deviation in the normal blood-supply of the brain, whether in quality or quantity, is liable to produce sleeplessness. The brain as a whole does not fall asleep at one time; on the contrary, the various centres in it become involved one after the other, beginning with the motor centre, and ending with the cardiac and respiratory ones. Any excitation of one or more of these centres is sufficient to interfere with repose of the whole, and not only may the irritation spread from one centre to the other, but different centres may be affected at the same time by the altered blood-conditions that are commonly present in heart disease.

We must remember, however, that even if heart disease is present, it by no means follows that the cardio-vascular system is at fault; or that those who have had a large amount of worry or brain work are suffering from nervous sleeplessness alone. This is important, as I believe it not infrequently occurs that patients are treated solely for overwork, when in reality they are also suffering from some latent heart disease.

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Worry, mental anxiety, overworking the brain, indigestion, pain, and peripheral irritation are among the commonest causes of sleeplessness, and may in heart disease act both as predisposing and exciting causes, under the heading of peripheral irritation being included any irritation of the nerve-endings in the alimentary or respiratory tracts, the skin, or the special senses. Influenza, which of late years has been a frequent cause of sleeplessness, also acts in this twofold manner. The influenza bacillus and its toxin act specially on the nerve-tissue, and by lowering the vitality predispose the individual to sleeplessness, while by affecting the nervous mechanism of the heart, and possibly producing endocarditis or degeneration of its muscular structure, influenza acts as an exciting cause, affections of the stomach or any other organ that may occur as sequelæ also acting in the same manner.

The capacity for sleep varies, and is greatly dependent on the hereditary predisposition, habits, and daily occupation of the individual. The hereditary predispositions that specially concern us are as follows:

(1) Nervous instability.

This may show itself in many forms, and even when it is not manifested by one of the grosser nerve lesions, we find those possessing it, even in a milder form, are unable to bear great mental strain, sleeplessness being one of the earlier symptoms of a breakdown.

(2) Defective metabolism.

This is also inherited and may show itself, especially in later middle age, by gouty manifestations, and high arterial tension with thickened vessels, in consequence of the retention in the system of waste products through defective elimination. These predispositions can also be acquired by ignoring the rules of health in relaxation and work; social and dietetic excesses, tobacco alcohol or tea in poisonous doses, want of exercise, or work carried on under insanitary conditions, all tend to produce exhaustion of the nervous system, and retention in the vascular system of waste products or other deleterious matter.

Occupation has also a marked influence on the sleep habit, brain workers sleeping less as a rule than muscle workers, for "the cerebral cells, from being in constant use, are apt to remain active after work has been abandoned, and while this is the case sleep is prevented." (Macfarlane.)

It is equally important to elicit all the details of the patient's previous health and habits.

The subjective symptoms that are chiefly complained of as being causes of sleeplessness in heart disease are, breathlessness, palpitation, indigestion, restlessness, and pain.

Respiration may be interfered with in various ways if compensation fails. Breath-hurry on exertion, which is the mildest form of cardiac dyspnœa, partakes of the nature of air-hunger, and is an inspiratory dyspnœa. When constant, it may interfere with sleep by preventing the patient lying down when he first gets into bed, or may occur in paroxysms and awaken the patient, especially if the stomach be unduly distended. When pulmonary dyspnœa is present as well, the breathing assumes more of a panting character, and may become extremely laboured, orthopnœa under these circumstances being nearly always present.

The cardiac and respiratory centres are intimately connected, and any excitation of the latter by impure or impoverished blood is speedily transmitted to the former, giving rise to palpitation, which is thus frequently associated with dyspnœa, and is nature's endeavour to remedy a defect. Neurotic females are especially liable to palpitation, and it is a frequent cause of sleeplessness in anæmic girls with large flabby hearts, and in cases of exophthalmic goitre.

Restlessness is a common preventative of sleep, and is frequently seen in gouty people, and in cases of chronic Bright's disease; it is also common to old people with dilated atheromatous aortas and thickened arteries, any aortic regurgitation increasing the tendency. Restlessness, or fidgets as it is popularly called, appears to assume two forms; in one there is a general feeling of restlessness, the patient being unable to remain in one position for any length of time; in the other the extremities are affected, especially the feet. It is impossible to keep the feet still; they feel hot and burning, and the patient is continually trying to find a cool place for them—seeking rest and finding none, aptly describing the tortures endured.

Pain in the chest may be due to various causes, the first and foremost of these being indigestion. This is the commonest cause of sleeplessness in its various forms, and is an especially frequent cause in heart disease, owing to the pressure of the distended stomach hampering the heart's action.

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Angina pectoris, in any of its various forms, may occur at night, sleep being frequently disturbed in females by the vaso-motor form, and in old-standing cases of aortic disease by angina pectoris gravior. Some of the minor forms of pain are commonly grouped together under the term "anginal;" they consist of various anomalous sensations partaking of the nature of angina pectoris, and arising from the stomach, heart, or aorta. The term is a convenient one, as the precise origin of chest pains is sometimes difficult to determine; moreover, the line of demarcation between palpitation and vaso-motor angina is very ill defined. Some neurotic females, with ovarian irritation and high arterial tension, seeming to hover between the two, a little extra worry being capable of developing an attack of palpitation into one of vaso-motor angina.

Aortic aneurism is another cause of pain and sleeplessness, and has in the present instance to be regarded from three points.

1st. The symptoms produced by mechanical pressure.

2nd. The co-existing diseases in other portions of the cardio-vascular system arising from the same cause as the aneurysm.

3rd. The secondary effects on the heart produced by Nos. 1 and 2.

Sleeplessness is not a serious item in heart disease, until marked loss of compensation occurs, providing the nervous system is strong, the arteries are sound and free from excessive high tension, and the digestion is good. When compensation fails, these act with double force, being aided by the deleterious effects of the sleeplessness itself. I have often been struck by the totally different sleeping capacities of apparently identical cases, but I have generally found they differed with respect to one of the points above mentioned. It is therefore necessary before commencing any line of treatment to decide how far the sleeplessness is dependent on causes other than heart disease.

The treatment that is specially required to *prevent* the recurrence of sleeplessness in heart disease itself may be summed up thus:

1. Correct as much as possible any constitutional tendency to sleeplessness.

2. Minimise as much as possible the amount of work required of the heart.

3. Improve the tone of the heart-muscle.

4. Treat complications as they arise.

1st. Neurotic and gouty tendencies are the chief predisposing causes of sleeplessness, and are most frequently present under 21 years of age, or over 40, respectively. They should be looked for in all cases, especially when sleeplessness persists in compensated heart disease, the treatment being dependent on the circumstances of each case.

2nd. The work performed by the heart may be lessened in various ways. When the heart is compensated the patient should abstain from everything that unnecessarily taxes it; laborious pastimes should be abandoned. and all sudden expenditures of muscular force avoided; he should be made to understand that while exercise is beneficial, hurry is injurious. After compensation fails, rest is essential, the extent being dependent on the urgency of the symptoms. Careful attention to diet will also materially help the work of the heart by improving the quality of the blood, lessening its quantity, and preventing indigestion. The food should be of a light, nourishing character, and as Dr. Clifford Allbutt pithily writes "easy to digest, and worth digesting"; fluids should only be given in limited quantities, and alcohol in only the smallest doses, unless urgently needed. Meals should be about five hours apart, and the evening meal not later than three hours before bedtime; if much debility, a teacupful of warm milk or beef tea may be given just after the patient gets into bed, and repeated between 2 and 3 a.m.; this is especially useful in aortic disease, and will frequently ward off an attack of angina. Saline or some other aperient and mercury also greatly relieve the work of the heart, and should form part of the routine of treatment. In chronic valvular cases I have frequently given a rhubarb and mercury pill (two grains of each) every other night for months, with great benefit.

High arterial tension not only causes the heart a large amount of work, but will of itself produce sleeplessness. The dietary and aperient measures referred to above are often sufficient to regulate it, but it is sometimes necessary to supplement them by giving iodide of potassium and nitro-glycerine in the manner suggested by me subsequently.

Means should be taken to prevent any chilling of the surface of the body, for the contraction of the cutaneous capillaries caused thereby, increases any venous congestion that may be present, and

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throws a large amount of extra work on the heart, this in some cases being sufficient to produce an attack of angina. It is therefore necessary not only that the clothing should be light and sufficient, but that flannel should be worn next the skin and draughts avoided. In the winter the bedroom should be heated before undressing, and the bed itself should be warmed, or, what is better still, natural wool sheets should be used.

3rd. The tone of the heart may be greatly improved by regulating the patient's mode of life; the excessive use of alcohol, tea, and tobacco should be stopped. Out-door walking exercise should be insisted on in all but the later stages, a short walk after the evening meal, if the weather is suitable, being most useful in sleeplessness. In mitral disease exercise and exertion should stop short of breathlessness, but in aortic disease definite instructions should be given as to the rate of walking, the inclines that may or may not be negotiated, and the amount of exertion the patient may undergo. If walking is out of the question carriage exercise should, if possible, be taken. When patients are confined to bed it is necessary to see that the room be properly ventilated, windows being kept open as much as possible. Under these circumstances I have found the daily use of oxygen gas of great use in relieving restlessness, by strengthening the heart and improving the condition of the blood. I also find that by administering it at night, when the patient is asleep, it makes the sleep longer in duration and more restful in character. The use of cardiac tonics and resistance exercises, or the administration of Nauheim baths, need not be entered on, as any line of treatment that is best adapted in each individual case to strengthen the heart-muscle will of itself lessen the tendency to sleeplessness.

4th. Complications may either be secondary to the heart disease itself, or accidental accompaniments, and their effect on the sleeplessness will depend on the extent to which they embarrass the heart's action; therefore in treating them we must take into consideration the other symptoms that are present.

In all cases of heart disease, our first treatment should be directed to relieving, if possible, the most urgent symptoms. Sleeplessness, if it is present to any great extent, must always be a serious symptom, and is bound to make itself felt in all cases, being in some a matter of vital importance.

We have, therefore, to decide when hypnotics are required, and what character of drugs should be given. The ill effect produced from the persistent and unregulated use of sleeping draughts by the general public cannot be too strongly condemned, and it enforces on us the necessity of using the greatest caution in prescribing them. They should be used either to break the habit of sleeplessness, which the system may have acquired, or to give rest when it is urgently needed. In the former instance the influence should be kept up for three or four nights, or a speedy relapse will follow. In many cases we obtain far better results by giving three or four smaller doses during the day than from a larger amount given in one dose at night; this specially applies to opium, chloretone and bromide. Our choice of drugs must always depend on the character of the case, and the complications that are present. To describe the various hypnotics that have been recommended would be waste of time. I shall only, therefore, give the drugs that I use myself, and the cases in which I have found them most useful.

Opium and morphia are among our most reliable sleep-producers, and when pain is present are invaluable; they can be safely given in any uncomplicated form of heart disease, and the presence of lung and kidney complications is by no means such a rigid bar to their administration as some would lead us to suppose. Greater care is, of course, required under these circumstances, and their effects must be carefully watched; but I have frequently used them with the greatest benefit when the lungs have been clogged and a large quantity of albumen present, after having failed to obtain sleep by any other means. If pain is very severe, and immediate results are required, morphia should be given hypodermically, care being taken in extreme cases to minimise the shock of inserting the needle as much as possible. While opium and morphia can always be relied on to relieve pain, they do not necessarily act as hypnotics unless the dose is larger than we may wish to give; for I frequently find their action is delayed, the patient not getting to sleep for hours, and sleeping better the second night than the first. Sometimes I can obtain a much better hypnotic result by giving a quarter or half-grain dose of opium three or four

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times during the day, than two or three grains at night; in other cases, one sixth of a grain of opium every hour for five or six doses during the latter part of the day, will produce a more satisfactory result.

Chloral hydrate should only be given when the arterial tension is high, and its depressant action on the heart is beneficial, as is sometimes the case in acute alcoholism. I have not, however, derived any special advantages from its use in other conditions to compensate for its depressing effects.

Chloralamide acts in the same manner as chloral, but has the advantage of being less of a depressant. It has been strongly recommended, but I have not found its action as speedy as that of some other hypnotics.

Trional is very useful and acts speedily. It has no special action on the circulation or respiration, and can consequently be given in any form of heart disease, but I have not found it satisfactory when pain is present. Sulphonal acts in the same manner as Trional, but as an hypnotic its delayed action is much against it. The combination of the two in ten or fifteen-grain doses each, has a more satisfactory effect than if they are given separately. If much prostration is present, as is sometimes seen after influenza, it is advisable to avoid their use.

Paraldehyde is a very useful hypnotic. It has no effect on the circulation or respiration, and can be given in any form of heart disease. As, however, it has a slight irritant action on the gastric mucous membrane, it is not always advisable to administer it when the cardiac sleeplessness is complicated by dyspeptic troubles.

Chloretone is one of the most recent additions to our list of hypnotics, and is very useful in heart disease. It has no depressant action on the circulation, can safely be given when kidney or lung complications are present, and is quick in its action; its special usefulness, however, in heart disease is due to the fact that it is not only a perfectly safe hypnotic, but a powerful germicide and anæsthetic as well, relieving the dyspeptic symptoms so commonly present by anæsthetising the coats of the stomach, and arresting fermentation. It is a perfectly safe hypnotic, a case having been recorded in which 120 grs. were given in twenty-four hours without any serious result. As an hypnotic I generally give 15 grs. at bedtime, and repeat the dose in two hours if required; where there is much excitation of the nervous system, I find 1½ or 2 grs. three times a day, with a 15-gr. dose at night, has an even more than beneficial effect, and produces sleep the second night without any further dose being given.

The bromide salts are chiefly indicated where the neurotic element predominates, and if given three or four times a day will often relieve sleeplessness; but I have frequently found them fail when any one of them is given as a pure hypnotic, in one dose at night.

Alcohol will in many instances promote sleep before heart failure has far advanced, and where restlessness is great; it should, however, only be given in small doses, just as the patient is settling down to sleep. If the arterial tension is very high it is worse than useless, as it may then increase the sleeplessness. In the later stages it may have a soothing, but not a hypnotic effect.

Having thus briefly described the most essential hypnotics, I shall now refer to the occurrence and prevention of sleeplessness in some of the more common forms of heart disease.

Simple hypertrophy of the heart, such as is frequently seen in athletes, will not produce sleeplessness unless some degeneration of the muscle is present, accompanied by dilatation and failure of compensation. When the hypertrophy forms part of general arterial sclerosis, with or without chronic disease of the kidney, restlessness and disturbed sleep are often present. Old people with thickened arteries and high arterial tension are very troubled with it, especially if the aorta is dilated and atheromatous, and the valves are insufficient.

Sleeplessness in these cases yields best to constitutional treatment, such as a plain mixed diet, containing a limited quantity of butcher's meat, an occasional dose of calomel followed by some saline, and a mixture such as follows:—Sodium iodide 3 grs., sodium bicarbonate 10 grs., liq. trinitrini ½ or ¾ minims, tincture nux vomica 5 minims, aqua chloroformi 1 oz. three times a day, the last dose being taken after the patient is in bed. If the restlessness still persists I give another slightly larger dose of nitro-glycerine in two hours time. If these means fail it may be necessary to give an hypnotic to break the sleepless habit. Opium in small doses during the day, or one larger dose at night, is more appreciated by patients

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than any other drug, but I find that trional and sulphonal combined, or better still; chloretone, yield very good results. No hypnotic, however, should be given in these cases unless it is urgently needed, for sleeplessness is present so frequently that a drug habit is sure to be acquired.

Dilatation of the ventricles.—In the early stages of dilatation the patients are generally restless, and liable to be awakened by troublesome dreams, but a fair amount of sleep may be enjoyed, even if some œdema of the lungs is present, unless the heart's action is hampered by distension of the stomach or some other complication. As dilatation increases sleeplessness becomes a very distressing symptom, and patients are often unable to get to sleep, or they may be awakened by an attack of paroxysmal dyspnœa, and lie awake for hours. When dilatation is secondary to valvular disease it may be confined, in the first instance, to either the left or right ventricle; but as dilatation of the right ventricle always results from causes that prevent the free passage of blood through the left ventricle, we find in cases of dilatation of the left ventricle that the right also becomes dilated if life is sufficiently prolonged. The general venous congestion which is then present, by causing catarrh of the mucous membranes and induration of the liver, kidney, and spleen, reacts in a secondary manner on the heart. Under these circumstances orthopnœa is almost invariably present, rendering sleep impossible in anything but short snatches, the uncomfortable position the patient has to assume entirely depriving sleep of the necessary restful character, the patient being liable to awaken with an intense struggle for breath, and, as it were, fighting for life. Since the invasion of influenza dilatation has been more frequent in all forms of heart disease, and in many instances previously sound hearts have become dilated by reason of its toxic influence on the nervous and cardio-vascular systems.

When the dilatation is not severe, sleeplessness can generally be relieved by mercurial purges, rest, and improving the tone of the heart in the manner as previously described; if they fail opium, paraldehyde, or chloretone should be given. If the dilatation is considerable six or eight leeches should be applied over the liver, and oxygen gas administered, two or three grains of calomel being given at the same time. Paraldehyde, or chloretone, or opium may then be given. Three or four small doses of the latter are sometimes of greater use than a large one, and I have always found it safer if administered in this way. The application of the galvanic current applied to the vagus has been strongly recommended, but I have never used it, except as a last resort.

The majority of patients suffering from aortic disease sleep well as long as the heart is properly compensated. Should, however, the regurgitation be very free, they are liable to be much disturbed by restlessness. In the young and middle-aged palpitation and anginal pains are more frequent in women than in men, but in later life the graver forms of angina prove a more frequent cause of sleeplessness in men than in women. Dyspepsia is especially liable to produce restlessness and anginal pains, and after compensation has once failed may cause severe attacks of paroxysmal dyspnœa. When the hypertrophy outgrows the blood-supply, and muscular degeneration with dilatation ensues, breath-hurry, or polypnœa, is present on any exertion, and patients may either find a difficulty in getting to sleep, or awaken from no apparent cause, any complications increasing the difficulties and producing paroxysmal dyspnœa. As degeneration advances the restlessness and dyspnœa increase in intensity, and orthopnœa is frequently present. Should dilatation of the mitral orifice permit a free regurgitation into the left auricle, dyspnœa speedily assumes the pulmonary type, and orthopnœa becomes almost constant. Under these circumstances anginal attacks become more frequent, the patient can only enjoy sleep for the briefest period, and the recumbent posture becomes impossible except towards early morning, returning heart vigour being often marked by a slightly earlier resumption of the recumbent posture from day to day.

If stenosis of the aortic orifice is present, and the heart is compensated, there is less restlessness, and consequently better sleep than in insufficiency. When, however, failure occurs, and the orifice is much contracted, palpitation, anginal pains, and true angina pectoris are frequent causes of sleeplessness.

If mitral insufficiency from disease of the cusps co-exists with aortic insufficiency, the sleeplessness depends, before compensation breaks down, on which orifice is most affected, patients being more

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sleepless when aortic disease predominates; but even then they do not suffer from it to so great an extent as in pure aortic insufficiency.

On the other hand, when aortic insufficiency and mitral stenosis are combined patients sleep badly, and suffer a good deal from restlessness and nervous irritability; cardiac dyspnœa is an early symptom, and orthopnœa frequently prevents sleep.

In compensated aortic disease regulation of the patient's mode of life is generally sufficient to prevent sleeplessness, medicinal treatment being reserved for those patients in whom the heart disease intensifies any predisposition to sleeplessness that may have already existed. It may also be caused by indigestion, restlessness, anginal pains, or angina pectoris, and should then be taken as an indication that the heart requires rest. The occurrence of indigestion must always be guarded against by careful dietary, but should it be present the treatment must depend on the nature of the case. Restlessness and anginal pains must be relieved by opium or morphia, which are more useful in this than any other form of heart disease. The risk of a patient acquiring the opium habit should not stand in the way of our prescribing those drugs if the patient can be benefited by their use. For even when slight loss of compensation is present, restlessness and pain will cause many broken nights and increase the failure unless means of relief are at hand. One or two grains of opium at bedtime, and repeated in two hours if necessary, will frequently in early cases give three or four good nights' rest. As failure advances, opium may be necessary every night; in some cases, however, smaller doses given during the day in the manner already described seem to produce better results. Chloretone answers well, and can be safely employed if the opium is not borne well, or it is advisable to get the patient off it for a time. If the sleeplessness is great, morphia should be given hypodermically, it being more effectual when administered in this way than any form of opiate by the mouth; but I delay injecting morphia as long as I can do so without detriment to the patient, as a craving is much more readily produced by this mode of administration.

In cases where angina pectoris occurs the usual preventive measures should be adopted, and nitrite of amyl capsules be within the reach of the patient if no night nurse is in attendance. Oxygen inhalation will be found most useful, even when cyanosis is not present, and should always be at hand when failure is considerable, and used in conjunction with the general treatment already laid down; a favourite combination of mine under these circumstances being iodide of potassium in full doses, liq. trinitrini and liq. arsenicalis, and tinctura nuc. vomica. If the case assumes the mitral type, the treatment recommended under these circumstances should be followed, but venesection is seldom advisable.

In cases of compensated mitral stenosis the sleeping powers differ greatly in the two sexes. Male adults, as a rule, sleep well; but women and youths, in consequence of being more neurotic, are liable to have their sleep disturbed by restlessness and palpitation, or they may be awakened by terrible dreams. When compensation fails, breathlessness on exertion is an early and persistent symptom, but it does not appear to interfere with sleep, even if œdema of the lungs exists, unless indigestion or one of the complications already mentioned are present. When this is the case nocturnal paroxysms of dyspnœa may awaken the patient, causing him to sit up in bed gasping for breath. If failure of the right ventricle and tricuspid regurgitation supervene, the general venous congestion causes catarrh of the bronchial and gastric mucous membranes, the resulting complications rendering the dyspnœa and orthopnœa persistent, and seriously interfering with the onset and maintenance of sleep.

Sleeplessness in the early stages of mitral stenosis can generally be relieved by carrying out the line of treatment already laid down. Should it, however, be due to any cause such as indigestion, special treatment should be adopted suitable to the form of indigestion present. When the lungs are secondarily involved, and failure of the right ventricle, with general venous congestion, is present, hypnotics should, if possible, be delayed until some relief has been given to the right ventricle. This can be effected in some instances by six or eight leeches over the heart or liver, but it is more rapidly accomplished by extracting ten to fifteen ounces of blood from the arm; for some patients, apparently moribund, not only seem to be able to bear venesection well, but readily improve

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by it. Inhalation of oxygen gas is most useful in relieving the restlessness and dyspnœa, and will often enable us to administer hypnotics, by improving the condition of the patient. The hypodermic injection of strychnine may also be tried, but it frequently fails unless the distended right ventricle is first relieved, the internal administration of digitalis generally failing from the same cause.

By using the above measures we are able to give hypnotics with much greater safety and efficacy. Paraldehyde or chloretone have been found by me to be the most satisfactory, although in many cases I have had to give opium as a *dernier resort*, and have found it answer when everything else has failed.

In cases of pure mitral insufficiency sleeplessness is less frequent than when stenosis is present. In women and youths it may in the early stages be due to the same causes as in stenosis, but is far more amenable to treatment. Cases where there is slight failure of compensation generally yield to rest and cardiac tonics and a nightly administration of a mercury and rhubarb pill, rendering hypnotics unnecessary. If, however, sleeplessness still continues, bromide, trional, or chloretone should be used. If there is marked failure of compensation, and dyspnœa or orthopnœa are present, the measures previously recommended in stenosis should be adopted.

In fatty degeneration of the senile heart the sleep is often of a restless dreaming character, and patients are liable to awaken with attacks of breathlessness. Cheyne-Stokes' respiration, which is seen in perhaps the most typical form in this disease, may itself cause sleeplessness, by preventing the patient getting to sleep, or by the "pause" awakening him, and consequently only permitting broken snatches of sleep. Anginal pains and attacks of true angina pectoris may also interfere with the onset and maintenance of sleep. Hypnotics are not as a rule required, it being generally sufficient to relieve the special symptom causing the sleeplessness. Oxygen inhalation will be found most useful in any respiratory difficulty, and may be used frequently for short periods at a time. Opium may be given when there is much restlessness or pain, providing the kidneys are acting freely. Morphia may be necessary hypodermically if there is much pain; but if the pain partakes of the character of true angina, nitrite of amyl, nitroglycerine, or erythrol tetranitrate should be given, at the same time the heart's action being strengthened by iodide of potassium, digitalis, and nux vomica.

In conclusion, I would repeat that sleeplessness in advanced heart disease is, in a large majority of cases, due to the heart itself; but when the diseased heart is compensated, or only commencing to fail, sleeplessness is most frequently caused by irregularity of some of the other organs of the body, the heart being secondarily affected. Consequently, if we administer hypnotics without specially treating the exciting cause we are only injuring the patient, by masking nature's outcry for help.

Operative Treatment of Ugly Ears.—Flaring ears are corrected by excising a vertical ellipse of skin and fascia from the posterior surface of the auricle and the adjacent portion of the skull, and then cutting a vertical wedge-like strip from the exposed cartilaginous structure of the organ. Sutures are then employed to sew the auricle close to the skull. Bandages or spring pads are to be used until the union is sufficiently firm to prevent tearing of the scar-tissue by unexpected movements during sleep. If a condition of gigantism co-exists with the flaring, the operation for reduction of the size of the auricle may be done at the same time. A similar method is to be employed in lap-ears, in which the auricle droops forward because of imperfect development of cartilage. The displaced organ should be sewed to the scalp in such a way as to neutralise the tendency to droop. It might he possible to stiffen the auricle by inserting a thin sheet of metal in the tissues. Perhaps such an implanted metallic strip could be bent, after it had become encysted, to resemble more closely the ridges and hollows. —*Monthly Cyclopædia*, December, 1900.

THE Chinese stop facial neuralgia by painting oil of peppermint on the skin, and the external application of this oil may give instantaneous relief in gout. It is the active ingredient in one of the best known liniments sold on the Continent for neuralgia. Ol. Menth. Pip. is also a not unimportant constituent of the tabloid Soda-Mint, of special use in flatulent heartburn.

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PROGRESSIVE MYOSITIS OSSIFICANS, WITH REFERENCES TO OTHER DEVELOPMENTAL DISEASES OF THE MESOBLAST.

A CLINICAL LECTURE

Delivered at St. George's Hospital, November 26th, 1900,

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GENTLEMEN,—Generally in a clinical lecture a case of ordinary occurrence—one which is of practical every-day use—is taken as the text. To-day our subject is a rarity; but I shall attempt to show that not only is it of interest, but that its consideration is of use, as bearing upon and enlarging our conception of some other diseases which attack the mesoblast. The last phrase I shall fully explain later. This case of progressive myositis ossificans probably many of you have already seen in the wards. The patient, a boy aged eight, was kindly sent to me by Dr. J. W. Carr, of the Royal Free Hospital, who showed him before the Clinical Society (the 'British Medical Journal,' November 3rd, 1900). This boy is one of eight children. There is no abnormality to be found in his family history. His father recently died of carcinoma,—a point of possible interest as bearing on the development of this condition of myositis ossificans. There is no history of rheumatism in the family; also a point of importance, because, as I shall tell you later, myositis ossificans has been thought to be connected with rheumatism.

The first thing noticeable about the patient is his peculiar attitude—flexion of the neck and upper part of the trunk, with fixation of the neck depending on ossification of the cervical muscles, a condition which is also very well shown in one of these pictures of another case under the care of Dr. Crawfurd ('Trans., Clin. Soc.,' vol. xxxii, p. 261). The body is bent forwards like that of an old man, while the shoulders and elbows are fixed, so that the boy looks as if he were carrying

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some invisible, though not inconsiderable, weight. The chest hardly moves at all with respiration, which is, therefore, diaphragmatic. There are ossifications in the two sterno-mastoid, complexi, and posterior scalene muscles, and in the scapular attachments of the rhomboid muscles. There are bony plates in the lower parts of the latissimus dorsi muscles close to their spinal attachment, while the same muscles in the posterior folds of both the axillæ are so hard as to feel like a knife-edge. Over the lumbar spine, in the region of the erectores spinæ, there are hard masses. The trapezii muscles are also affected. A marked feature is the comparative fixation of the upper extremities. The pectoral and latissimus dorsi muscles in the anterior and posterior folds of both axillæ are markedly ossified; they feel almost like the blade of a knife under the skin in the folds of the axillæ. In both arms the biceps and brachialis anticus muscles are extensively ossified; this, no doubt, adds to the fixation of the shoulder and elbow-joints. The pulse is small, probably from pressure on the brachial artery. The triceps and the muscles of the forearms are unaffected. The recti abdominis muscles are both affected, but none of the muscles in the lower extremities are involved. The change, therefore, chiefly affects the upper part of the trunk and the neck. There is a peculiar alteration in the thumbs and great toes; they are much shorter than they should be. The great toes do not reach up to the level of the second toes. This condition of microdactylie is very characteristic of the disease, and occurs in 75 per cent. of the cases. It, however, varies considerably in detail, and is not the same in the thumbs and in the great toes. In this case there is no ankylosis of the phalanges of the thumbs, such as has been described in some other cases, and the phalanges are fairly normal; the shortening seems to depend largely on dwarfing of the metacarpal bone. The left great toe is smaller than the right; there is commencing ankylosis between the two phalanges; slight movement is possible, and conveys a sensation of crepitus. The skiagram, kindly taken by Mr. F. T. Addyman, shows that there is no bony continuity between the two phalanges. The right great toe shows ankylosis of the inter-phalangeal joint. Both the great toes are directed outwards, so that there is partial dislocation of the metatarso-phalangeal articulation. The terminal phalanges of the little toes feel as if they were tending to ankylosis, though the skiagrams do not support this. It may be mentioned that ankylosis in this situation is not very infrequently seen in otherwise normal persons. The dwarfing of the thumbs and great toes would appear to be a congenital deficiency, and is of interest as indicating that some inherent vice of development underlies progressive myositis ossificans. Ankylosis is probably a secondary and progressive change, like the ossification in the muscles and the eruption of exostoses. Before the days of the X rays the condition resulting from ankylosis of the phalanges of the great toes was described as absence of one phalanx.

A very curious point about our patient is this exostosis on the head of the first phalanx of the right middle finger. It is a remarkable fact that in Dr. Herringham's case ('Clinical Society's Trans.,' vol. xxxii, p. 1) there was exactly the same peculiarity. On both tibiæ, close to the attachments of the sartorius muscles, there are exostoses: the one on the left side is the more prominent: they are both enlarging. There is a considerable thickening of the bridge of the nose, involving the nasal bones, which has struck me as being a little like the condition figured and described by Professor Macalister in his paper (Royal Irish Academy, December 11th, 1882), which I pass round, on the horned men in West Africa. In Dr. Manson's book on tropical diseases (p. 594), where you will see an illustration of this same condition under the name of Goundou or Anakre, it is stated that it has been thought to be due to a parasite setting up an inflammation of the bones; while by others it has been regarded as the result of periostitis due to yaws, or—and of this there is no proof—as atavism, or reversion to a lower type.

The head is elongated or dolichocephalic. The eyelids are somewhat pigmented. The thyroid gland cannot be felt. There are exostoses asymmetrically placed on the frontal bones, and marked bony ridges and projections, apparently exaggerations of those normally seen, on the occipital bone.

So much for the boy himself. We will now consider the general outlines of the disease myositis ossificans. It is divided into two forms:—(1) Local, which is not progressive, and is dependent on inflammation, such as may be started

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by phlebitis and thrombosis, or by inflammation of a gland, spreading into the adjacent muscles. The inflammatory exudation undergoes calcification, as it often does in other parts of the body, for example, in the capsule of an old hydatid cyst, in tuberculous glands, or, to take an example in the muscles, the calcification which takes place in connection with trichina spiralis. The local form of myositis ossificans is of little or no clinical interest. (2) Myositis ossificans progressiva, which concerns us to-day. This extremely striking disease has been known for a very long time. The first case seems to have been recorded in 1740 by Freke, in the 'Philosophical Transactions of the Royal Society.' For a full account of this disease I may refer you to a recent exhaustive paper by an American physician, Dr. Lydia M. De Witt,* based on seventy-eight cases. Such a remarkable condition has naturally attracted a good deal of attention, and sometimes the same case has been described by two different observers. It is a disease which is not hereditary; I believe there is as yet no recorded case in which parent and child have suffered from the same disease. It generally, however, comes on early in life, and progressively gets worse. It attacks the male sex by preference in the proportion of five males to one female. It is spoken of as being a congenital disease, meaning that it depends on some congenital aberration of growth; but children are not born with it, although the disease depends on some congenital deficiency. It may start after some definite exciting cause, such as an injury. An accident which would be insufficient in ordinary people to give rise to the bony formation sets up this condition in these children. It has been supposed to be sometimes started by rickets; this seems reasonable, as the affected bones and the attached muscles are so close to each other.

Now a few words about the course of the disease. I have already said that it gets progressively worse. From time to time painful areas of induration appear in the muscles, due not to ossification or to calcification, but to inflammation. These thickenings of the muscles are very much like those described in rheumatic myositis. At the same time the local temperature may be found to be raised, and the skin may be reddened and possibly œdematous, so that there is definite evidence of inflammation. After an attack that area becomes calcified, and eventually changes into bone. As time goes on more and more muscles become affected, and in greater degree, and of course become useless. It is often associated with exostosis, as in this boy.

With regard to the morbid anatomy of the disease three stages are described. In the first stage there is a definite inflammation taking place in the muscle, between the muscular fibres. It seems to be a fairly acute interstitial myositis. In the second stage organisation has taken place, and there is very considerable fibrosis—an increase in the amount of fibrous tissue—with atrophy and degenerative changes in the muscular fibres. In the third stage this fibrous tissue has become changed into bone. The muscular fibres are only affected secondarily. They are healthy except where they are invaded and compressed by the interstitial tissue, so that primarily it is an interstitial inflammatory process. As the disease progresses more and more muscles become affected, and the corresponding joints fixed. You will have noticed that the breathing in this boy is almost entirely diaphragmatic; his thorax hardly moves at all. You will readily understand, therefore, that one of the dangers in a case of this kind is that the patient is very likely to die if he gets bronchitis or pneumonia. In other cases, probably as a result of traumatism, these hard masses in the muscles undergo suppuration, and as the result of continued suppuration the patient becomes worn out and dies of weakness. In other cases bedsores may come on. This boy, in fact, shows healed bedsores on the great trochanters of the femora.

Diagnosis.—The disease is so marked that perhaps it is hardly necessary to say very much about the differential diagnosis of it from other diseases. Still, there are some conditions for which it may possibly be mistaken. One of these is multiple exostoses. This developmental aberration, which may be hereditary, may also extend into the muscles. Here is a specimen showing a very marked rider's bone, from a man under Mr. Haward about ten years ago, who had multiple exostoses; one of the exostoses underwent sarcomatous change, and led to his death. He had a son seven years of age who was also covered with

* 'The American Journal of the Medical Sciences,' Sept., 1900, vol. cxx, p. 294.

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multiple exostosis. When multiple exostoses spread into the muscles by their perisosteal attachments, the condition approaches that seen in myositis ossificans.

Another condition is osteitis deformans. Here is a skull exhibiting this change. Probably most of you have seen the entire skeleton of osteitis deformans recently put up in the museum. This change comes on later in life, and only attacks the bones, not the muscles.

There is also tabetic arthropathy, or Charcot's disease of the joints in locomotor ataxia. This acute degenerative change in the joints often leads to very extensive ossification taking place in the neighbouring muscles. Here is a rectus femoris muscle, eight inches long, which forms a rigid spike, and looks exactly like bone. Of course there should be no difficulty in distinguishing the two; in myositis ossificans the joints are not themselves absolutely affected, whereas the morbid change in Charcot's disease begins and has all its chief clinical manifestations there.

There is a rare condition, rhizomelic spondylosis (Marie), in which the vertebræ are ankylosed, and the extremities become ankylosed to the trunk at the shoulder and hip. In fixation of the spine and shoulder-joints myositis ossificans may resemble this rare form of disease, which probably belongs to the overgrown group of diseases classed under the term of rheumatoid arthritis. But there is no myositis ossificans in rhizomelic spondylosis.

Treatment.—With regard to the treatment of myositis ossificans, idodide of potassium, arsenic, and various other drugs have been tried, but nothing has been found to have any real effect on the course of the disease. Thyroid extract is being tried on this boy, and for the reason that the thyroid gland seems to have a special association with connective tissue, or with the mesoblast. In cases of myxœdema there is an overgrowth of the connective tissue. In very rare cases of atrophy and calcification of the thyroid gland, multiple painful fatty tumours appear over the body; this form of myxœdema is spoken of as adiposis dolorosa, or Dercum's disease; here is a picture of a woman with this rare affection exhibited by Sir H. Beevor (Clinical Society's 'Transactions,' vol. xxxiii, p. 251). Its treatment is that of myxœdema, viz. thyroid extract. Thyroid medication also produces improvement in congenital myxœdema or cretinism, where fatty lumps are present in the supra-clavicular fossæ. Though, perhaps, a forlorn hope, it seems reasonable where there is some inherent aberration of the mesoblast to give thyroid extract, and watch the effect. As I pointed out, this boy's thyroid is extremely small. [This treatment did not appear to lead to any improvement, or check the progressive character of the disease, December 23rd, 1900.] The occurrence of attacks of myositis should, as far as possible, be guarded against by protecting the patient against cold and traumatism. Possibly salicylates might prove of use in warding off rheumatic myositis.

Pathogeny.—Perhaps the chief interest in a rare disease like this is connected with the explanation which can be given of the condition. It is generally admitted that its pathology is unknown, or, at any rate, not satisfactorily explained. Several theories have naturally been put forward to account for it. It has been thought that this ossification in the muscles is purely a new growth, very much the same kind of thing as multiple exostoses, taking place in the muscles instead of in the skeleton. Now against this view is the fact that the microscopical appearances seem to show that the process is primarily and essentially an inflammation. Virchow considered that it was on the borderland between an inflammation and a new growth. It has been thought to be a developmental abnormality. Another view is that this change in the muscles is analogous to the change which takes place in some of the primary diseases of muscles, or the myopathies, and that it is analogous to pseudo-hypertrophic paralysis, in which there is an increase in the amount of fibrous tissue and fat in the muscles, but that the process goes further than that, and that there is an ossification on the top of the fibrosis. Another view, put forward by Stonham, is that it is a rheumatic condition, allied to muscular rheumatism and rheumatoid arthritis: instead of bony formations around the joints, these occur in the muscles. It may possibly be allied to that condition, but it evidently is not rheumatoid arthritis, since the joints are either not affected at all, or not in the same way as in osteo-arthritis.

A rather vague suggestion has been put forward that it is a reversion to a lower type, and due to atavistic influences. There do not appear to be

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any convincing arguments in favour of this hypothesis.

A reasonable view as to the nature of myositis ossificans is as follows:—The microscopic appearance would tend to show that it is primarily an inflammation. Myositis, such as is seen in connection with rheumatism or other infections, does not go on to calcification and ossification; but in Charcot's disease, where presumably the nutrition of the muscles near the joint is altered, extensive ossification may occur; while in myositis due to the trichina spiralis calcification of the capsules of the parasites may be met with. In myositis ossificans progressiva there appears to be a marked tendency both to myositis and to subsequent calcification. The muscles, as in the myopathies, seem to be endowed with especially feeble powers of resistance. There would appear to be a disposing factor of congenital origin; further evidence in favour of this is seen in the presence of microdactylie and of exostoses. As bearing on this I may quote a case recorded by Mr. Willmott Evans ('Transactions,' Clinical Society, vol. xxxii, p. 280) of a man aged fifty-four with malformed fingers and congenital constriction of the right thigh, who developed a hard calcareous mass in the left tendo Achillis some years after injuries. In short, *myositis ossificans depends on* (a) *a congenital weakness or want of resistance, and* (b) *a tendency to aberrant growth on the part of the mesoblast; as the result of diminished resistance the muscles are more susceptible to inflammation, while the tendency to aberrant growth subsequently shows itself in the calcification and ossification of the inflammatory products.*

Developmental diseases of the mesoblast.—I will now say a few words about developmental diseases of the mesoblast. It is a noticeable fact that the mesoblast is very much more prone to irregularities of growth than either the superficial skin layer (epiblast) or the lining of the alimentary canal (hypoblast). Like all innocent tumours, the growths of the mesoblast tend to be multiple. There are a number of diseases which seem to depend on some congenital aberration of development and growth in the mesoblast. In this connection it will be convenient to divide the mesoblast into the following layers:

1. Tegmentary layer—
   (*a*) Superficial. Junction of epiblast and mesoblast. Affected by molluscum fibrosum; generalised neuro-fibromatosis.
   (*b*) Deep. Affected by multiple fatty tumours.
2. Skeletal layer—
   (*a*) Muscular layer. Affected by myositis ossificans and by myopathies.
   (*b*) Bony layer. Affected in multiple exostoses and enchondromata.

The tegmentary layer of the mesoblast, meaning by that the true skin or dermis and the subcutaneous tissues, may be divided into—

(*a*) The more superficial part. Where the mesoblast joins the epiblast there seems to be a considerable tendency to irregularity of growth; for example, multiple molluscum fibrosum, and tumours situated on, and derived from, the fibrous sheaths of the nerves. In connection with these fibro-neuromata or pseudo-neuromata, you will remember that the nerves come partly (sheath) from the mesoblast, and partly (nerve-fibres) from the epiblast. In generalised neuro-fibromatosis, or v. Recklinghausen's disease, there are a collection of mesoblastic lesions—viz. multiple tumours of the nerves—formed of fibrous tissue, and due to some irregularity of growth taking place where the mesoblest joins the epiblast; pigmentation of the skin; and the development of multiple tumours (molluscum fibrosum) arising from the superficial part of the dermis.

(*b*) The deeper part of the tegmentary layer of the mesoblast may give rise to multiple fatty tumours.

2. The deeper and skeletal layer of the mesoblast may again be divided into two—(*a*) the muscular layer and (*b*) the bony layer.

(*a*) Aberration in development and growth of the muscular layer might be thought to give rise to pseudo-hypertrophic paralysis, where the really atrophied muscles are increased in size from the addition of fibrous tissue and fat, and also to be responsible for the evolution of other myopathies and myositis ossificans.

(*b*) Diseases of the bony layer, such as multiple exostoses and enchondromata, I have mentioned already.

In these examples the aberrations of growth are limited respectively to different parts of the mesoblast, but the aberrations may be much more ex

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tensive and wide-spread, and produce great deformity. Fortunately this is rare. Here is a picture of "the elephant man," who was in the London Hospital under Mr. Treves ('Trans. Path. Soc.,' vol. xxxvi, p. 494, plate xx). He had masses of pendulous skin, evidently containing much of the subcutaneous connective tissues, and extensive bony growths. He therefore had over-growth of the greater part of the mesoblast. Myositis ossificans when combined with multiple exostosis is an example of developmental aberration attacking the whole of the skeletal layer of the mesoblast.

A NOTE ON THE STAINING OF BLOOD-FILMS.

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As difficulties are frequently met with by the practitioner in obtaining stained films of blood for examination in such diseases as leucocythæmia, etc., the following note may be of some use to those who are interested in this means of diagnosis:—The difficulty usually met with when using eosin and methylene blue, which is probably the best and most often used stain, is that the red discs are stained well with the eosin, but the nuclei of the cells do not take the blue, or, if they take it, only in a very slight degree. The following technique will be found to get over that difficulty:—The films are made in the ordinary way, and fixed for from six to twenty-four hours in equal parts of alcohol and ether. After fixation the film is washed in water, treated in an alcoholic eosin for thirty seconds, and then washed in water. After that, instead of staining from thee to five minutes in watery methylene blue, I have found the following method give better results:—Filter a little watery solution of methylene blue into a watch-glass and heat it over a flame until it just boils. Remove from the flame, and at once immerse the cover-slip in the now hot fluid for from ten to twenty seconds. Wash in water, dry, and mount in Canada balsam. On examining the film under the microscope it will be seen that the red discs have retained their full modicum of eosin, and the nuclei of the cells (and the hæmatozoa of malaria, if such are present) are coloured what is really a deep blue, and not the faint blue which is so often obtained by the cold method.

THE POSITION OF RADIOGRAPHY IN MEDICINE.

An Address delivered before the South London District, Metropolitan Counties Branch, of the British Medical Association, at Guy's Hospital, January 17th, 1901,

By EDWARD W. H. SHENTON.
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MR. PRESIDENT AND GENTLEMEN,—Those who spend their time in the society of the Röntgen Rays will agree that, since the advent of this wonderful light, more energy has been directed to the perfecting of apparatus than to the systematic investigation of disease. It is perhaps fair to go farther, and say that only the present day sees the instrument in a condition to adequately examine the deeper portions of the human body. There need be no wonder, therefore, that radiographic diagnosis is as yet in its infancy, and consists of scattered facts which become fewer as the deeper structures are approached. Advance has taken place in direct proportion to the amount of available Roentgen light. This accounts for the greater use of the rays at first in surgery, especially that of the limbs, the somewhat later and more limited uses in medical cases, as soon as the chest could be penetrated, and the almost entire neglect of midwifery and abdominal conditions. With the exception of urinary calculus these last cases cannot yet be examined with any degree of ease or surety. It is possible, however, to affirm that at the present day the stoutest individual may be penetrated in a reasonably short period. Under favourable conditions this period need not exceed thirty seconds, a space of time that cannot possibly be detrimental to the patient nor tedious to the operator. A substance that cannot be penetrated in this time cannot be penetrated at all. Months hence it may be possible to see the conditions present in the hip-joint with as much ease as, at present, those in the thorax. But whether or not the rays will be produced upon such a scale in the near future need not be the concern of those who are using them—there is yet so much to be done by the careful consideration of what the rays now show, for it is evident that there are shadows on the fluorescent screen that we have not learned to see.

When radiography was merely a special branch

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of photography no one would have cared to have claimed a place for it in medicine.

At the present day few would dispute that it has a right to be classed with other methods of diagnosis, and the evidence that is afforded by a summary of the work done in the skiagraphic department of a large hospital should be valuable in showing what are the truly practical and genuine characteristics of radiography, and what position it holds in relation to the various branches of medicine in the midst of which it exists.

The word work must be accepted in its broadest sense, and will include anything of interest or importance that has been discovered; any conclusions that have been come to, the results of every-day experience; and any facts that by their continual occurrence have established themselves as landmarks to the observer.

Such a summary one has endeavoured to make; a much greater undertaking than it would at first appear, and one that is but imperfectly accomplished here. No mention will be made of the therapeutic uses of the X rays, the subject not being strictly a branch of radiography.

The subject of radiography comprises so much that is purely electrical and photographic that it is well to give a brief description of the apparatus and methods that experience has taught to be the most effective. The description will be confined to such apparatus, etc., as are used in the Guy's Radiographic Department, and which are in many cases peculiar to it. To begin, then, at the beginning of everything electrical, the source of current must be considered. This is a continuous current of 105 volts.; the alternating current cannot be compared in efficiency. The coil, the next most important consideration, is one of careful construction, especially where insulation is concerned. It is wound upon the multiple-section system, which has great advantages over the more usual bobbin winding. This coil gives a good continuous ten-inch spark, one that is thick and furry, and takes place at each interruption of the make-and-break apparatus. The latter is essentially composed of a wire dipping in and out of a cup of mercury at a speed entirely under control. This is managed by a crank actuated by an electro-motor. Experience has shown that such a motor must be of solid construction, so that it will not only run at a high speed, but will also run slowly and regularly. There are many interruptors which are lauded for their high speed capabilities; the real test of an interruptor is its power of adjustability from sixty revolutions per minute upwards. There is one more important point to be seen to in a good interruptor, and that is its capability of adjustment so that make and break shall bear any relation to one another demanded by the quality of the tube; that is, that make shall be longer than break, or *vice versâ*. Mention must be made of the recently introduced Wehnelt electrolitic interruptor. This has many attractions. It gives a perfectly steady light, a virtue in which the mercurial break does not compare. Its drawbacks, however, become apparent to the everyday worker, and my own experience is that what the mercurial will do at its best is a little better than what the Wehnelt can do under the circumstances. In the Wehnelt the interruptions are so fabulous in speed that no use is made of the condenser of the coil, and this is possibly why the effect is not quite so intense.

The last electrical item to be considered is the tube from which the rays emanate, and upon the efficiency of which the whole subject turns. There are many patterns of tubes; some are made according to theories, others are not. As a rule the latter are of more practical use. The tube that we use exclusively is one that has been made from my suggestions by Mr. Dean, of Hatton Garden, who is also the constructor of all the apparatus in this department. No theoretical advantages can be claimed for it. It is very large, and of the simplest of designs. There are two instead of three electrodes. The end that has been attempted and attained in the making of this tube is to obtain more of the rays that have the quality required to give good contrast between bones and flesh, and less of the rays that confuse upon the screen and fog the photographic plate. Since receiving this tube exposures have been cut down from minutes to seconds, and routine exposures now vary from a flash to thirty seconds. With this diminution in exposure comes, of course, increase in the capabilities of the screen,—perhaps a more practical benefit, since it has enabled one to see upon many occasions a renal calculus, *in situ*, upon the fluorescent screen. Some renal calculi that can be seen in this way are impossible to record photographically, so that the screen

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alone will be of service in clearing up a doubtful diagnosis.

Next in importance to the tube comes the method of examining the patient. For general work, where the conditions to be satisfied are the securing of the best possible screening and photographic results, comfort to the patient, and entire control and ease in working for the operator, no method can be compared with that in which the patient lies in a horizontal position, with the tube beneath him, and the screen above. To carry out this I have designed a couch the top of which is made of canvas, an X ray transparent substance, upon which the patient is placed, and beneath which the tube-holder travels. By simple mechanism the tube can be moved about by the operator as he watches the effect upon the screen. When he has satisfied himself by manipulation of the limb what is the condition of the part under observation, he selects the view which he wishes to record, and merely substitutes the plate for the screen. The alternative to this system is to place a plate beneath the injured part, and in a happy-go-lucky way to arrange the tube above without having the remotest idea of what the image upon the plate really is like. It has been suggested that certain points in the body should be marked and agreed upon, so that when an elbow, for instance, is to be radiographed, the tube must be placed exactly over the internal condyle. Such a suggestion could have only emanated from a theorist, and a practical worker will at once understand how useless and full of fallacies such a system must be. In the method I have described, where the tube is beneath the patient, there is no difficulty in making out which are the correct rays, and which the oblique that give distortion. A special couch is not an absolute essential, and a good makeshift is an ordinary stretcher supported either end upon the seats of two chairs. The tube, if held in an ordinary small wooden stand, can be moved about by means of a stick or other simple method. The tube-holder for use with this couch is a little peculiar, in that it supports the tube at both ends, a rather necessary proviso when using tubes of this size and weight. This concludes the description of the apparatus, which, though as complete as one could wish, and capable of doing all that radiography in medicine can do, is yet of simple construction, and devoid of complications. It is impossible to urge too strongly the necessity of keeping to simple form in apparatus, and of avoiding elaboration of all description.

For the exact localisation of foreign bodies, since the introduction of tubes which give good screen effects, special apparatus has been almost entirely dispensed with. A long difficult process, and the use of complicated and expensive apparatus, has been replaced by a simple method, which can be performed without any special appliances, and without resort to photography. By virtue of its simplicity it is free from the liability of erroneous deductions. By localisation is meant the conveyance to the mind of the surgeon of the exact position of some embedded substance. It should be clearly understood that this is not the only thing to make the subsequent operation successful, and a surgeon is often most unfairly criticised by the public if he fails in the search for a foreign body when the Röntgen rays have been called into requisition. The rays will, however, if carefully applied, be of immense help; if not carefully applied the surgeon is not assisted, but considerably misled. The skiagram by itself has proved of very little use in these matters, and the operator would do well to always harbour a wholesome scepticism of its apparent virtues. It should be generally understood that the skiagram can so misrepresent matters that it becomes a positive drawback in the extraction of a foreign body. This point has been illustrated by innumerable instances. The only sure and reliable assistance that can be given the surgeon by the Röntgen rays comes from the screening methods. It is true that at times these may be usefully supplimented by the skiagram, but, as in most examples of radiographic diagnosis, the photograph is but confirmatory to the screen. The method that we have used exclusively in this department for the last few years, an account of which I published in the 'Physician and Surgeon' for April 19th and 26th, 1900, is as follows:—As soon as the object sought can be seen clearly upon the screen, the tube is moved slowly too and fro. As the tube moves, so the picture upon the screen moves, but in the opposite direction. It is noticed that in this moving picture all objects do not move at the same rate. The reason for this is obvious, for those which are farther from the screen will move

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faster than the shadows of those which are nearer. Anything actually touching the screen will remain stationary. Two or more bodies situated at the same distance from the screen will move at the same rate or, what comes to the same thing, will remain the same distance apart whether the tube be moved to the extreme right or the extreme left. It is upon this latter fact that the localisation of a foreign body depends. A probe, for instance, placed in such a way that the shadow of its point will keep an equal distance from one end of an embedded needle, will be at exactly the same distance from the screen surface as this end of the needle. For extra convenience I have a little instrument that can be attached to the side of the screen to exactly record this last measurement. This is briefly the principle which, when applied in various ways, can in a few seconds give exact measurements from any points upon the patient's skin to the substance sought. In the last twelve months 138 needles in hands and feet have been successfully extracted without the taking of a single skiagram. With the tubes at present in use it is possible to see upon the screen a metallic substance in almost any region of the body, and where it is impossible to see the substance upon the screen, none but the most sanguine surgeon would care to operate. A bullet lodged against the neck of the femur of a solidly built man is one among several difficult tasks attempted by this method, and the necessary measurements were obtained in three minutes. The stereoscopic system that was in use before the days of good screening has not been adopted for the last two years in this department, chiefly because of the long photographic processes involved, and the inaccuracies of which it is capable in the hands even of experts. To see a portion of the human body stereoscopically is a most striking sight, but when one considers the elaboration of apparatus necessary for its performance, and what small advantage, if any, it possesses over other systems, it seems likely that stereoscopic radiography will remain on an equal footing with stereoscopic photography, and be used for an occasional case only.

In this hospital, where any apparatus that will make methods more perfect is at once forthcoming, the localisation of the smallest portion of a needle is daily accomplished without special device.

It would be an interesting question to have satisfactorily answered, Why so much cumbersome machinery has been sent with the X-ray experts to South Africa, where the simple task of localising a bullet could have been more quickly performed without it?

Owing to the distance this department is away from the medical wards, most of the cases examined have been from the surgical side. Special apparatus and arrangements are almost complete, whereby the medical cases will be examined in their own wards, and this will lay open an interesting field for investigation. The examination of the chest by the Röntgen rays has proved an adjunct to clinical methods that cannot well be neglected where other methods are not conclusive, or need confirmation. The structures in the thorax that are most readily examined by the new light are the lungs, the heart, the aorta, the bronchial glands, the large vessels at the roots of the lungs, the œsophagus, the trachea bronchi, and pleuræ. When it is stated that almost any pathological condition in the lung is manifested by undue opacity or the reverse to the transmitted rays, the use of the X-ray instrument as a means of diagnosis at once suggests itself. In the normal human subject the lungs present a clear space upon the fluorescent screen traversed by dark lines radiating from the lung roots, the pulmonary vessels. Other opaque lines indicate divisions between the lobes, but these cannot always be clearly made out upon every chest. Through the lungs are to be seen the scapulæ, the spines being most noticeable. Consolidated lung gives an area of opacity corresponding to its position. It does not matter whether consolidation be upon the surface, or in the midst of the lung; and thus in this particular radiography has the advantage of percussion, the value of which diminishes with the depth of the consolidation from the surface. Central pneumonias have been diagnosed in this way by the rays alone. Cavities are evident by a clear area seen upon the screen. Generally speaking pathological conditions of the lung may be accurately diagnosed by the Röntgen rays. There is some dispute whether in the case of early tubercular deposit evidence of mischief is first obtained by the rays or the stethoscope. It will be fair to say that at the present time both methods stand upon an equal footing. There are certainly cases where the stethoscope will give the

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alarm first, but there are certainly those where the rays will show trouble before any definite information can be obtained from the stethoscope, etc.

Among the conclusions that have been forced upon one in the past year there has been none so strong as this, that the X-ray apparatus is essentially an instrument of diagnosis, and one which, to be of thorough use, must be used in conjunction with other methods of examination. When the rays get into disgrace, it is generally because they have been relied upon in opposition to, or unassisted by, other more usual methods of diagnosis. It is not likely that in the X-ray instrument we shall have a machine that will replace all other ways of examination, nor yet one that will replace the medical man himself, as some have feared. The certainty that is conveyed to the mind of the practitioner by the confirmation of his own previously formed opinion is, perhaps, one of the most valuable points in radiography.

With regard to the diagnosis of fractures by the X rays, the advantages that have been most apparent are :

1. The readiness with which any fracture has been determined with a minimum of pain to the patient. This has been noticed especially in the case of injuries to the bones about elbow- or ankle-joint, accompanied with swelling.

2. The ease with which a fracture may be certainly excluded, and the treatment thereby modified.

3. The examination of the fracture during the process of setting.

With regard to the exclusion of fracture, it has been noted that it is not safe to assume that no fracture is present from the results of screening alone. A negative should always be taken in these cases. Photography will show cancellous tissue, which the screen will not, and disarrangement of this tissue invariably accompanies fracture. When there is no very apparent deformity of the outline of a bone, a careful examination of the light area which marks the position of the medullary canal should be made. This last is possibly the most valuable sign in the case of suspected but obscure fracture. It is often urged that a skiagram may be deceptive ; and no one who gives the matter a moment's thought will deny this ; it is a fact that forced itself upon the workers in this department very early in the history of the rays. In a skiagram the lesion is seen from a single point of view, and it is surely contrary to all teaching in medicine to make a diagnosis from the consideration of a single fact. That in many instances a trained eye can rightly judge the nature of an injury from a radiographic picture is merely a proof of the value of the X rays. To habitually make diagnoses, however, from skiagrams would be on a par with always making up one's mind as to what diseases were present by the consideration of a single physical sign. This has an important bearing upon the subject of medico-legal cases of fracture, since it has happened that a radiogram has been produced in court in cases of *malpraxis*. Added to this is the fact that almost invariably the skiagram shows matters to be much worse than clinical evidence would suggest.

It has been noticed that in a great number of old cases of fracture, where the result has been considered quite satisfactory by patient and surgeon, the skiagram has shown a large amount of deformity, and it has been often necessary to make this fact known to surgeons, who have expressed great surprise and disappointment at the appearance of what they had considered an excellent mend. It is quite obvious, then, that this sort of thing might well lead a jury to an erroneous conclusion.

A good illustration of how much deformity may be present in a skiagram which is unobservable otherwise, may be seen in the case of an old Guy's man, who broke his leg in a cycle accident. His leg was put up at once, and what appeared to be an excellent position was obtained. At the end of a fortnight he came into Guy's, and the leg was examined in this department, and the condition found to be one of oblique fracture of tibia and fibula, with considerable overlapping of the fragments.

It was decided to make an attempt to get the fragments into apposition, and to this end an anæsthetic was administered. No amount of force was sufficient to undo the firm union that had taken place ; and, but for a slightly sprained ankle, the leg remained as before. In a short time he was walking about, and there was no clinical evidence of shortening or other deformity. He himself notices nothing amiss, and looks at his skiagram with astonishment.

There is one thing, however, to be said about

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these clinically good, but radiographically bad, results, and that is that it may only be course of time that will prove whether such a result is really satisfactory. Mr. Lane has pointed out that the ill effects may only be apparent later; and in support of this a fractured tibia was examined the other day where the injury took place thirty-five years ago, and the patient was now experiencing pain in both knee and ankle from the effects of the altered strains upon the joint surfaces. The patient is now fifty-six years of age, and it is supposed that with the degeneration of age these joints have commenced to show their inability to withstand these strains.

The rarity of transverse fractures of the tibia has been very noticeable. Out of thirty consecutive cases of fracture of the middle third of the tibia, only three were transverse. A still more interesting fact is that, of the remaining twenty-seven, every fracture was oblique, with the direction of downward and inwards. In the past year we have not examined a single case of fracture in this region which had the direction of downwards and outwards.

Fig. 1 is a typical example of these fractures. In such of these cases as were put under the rays a great deal of extension was needed to get anything like a good position—much more than those attending the case had supposed to be necessary. It is, perhaps, needless to add that the best results have been seen in those cases that have been wired or screwed.

The only other fracture that will be mentioned here is the fracture so very commonly met with in young children who fall upon the extended arm. It is a fracture at the lower end of the humerus, with the general direction of downwards and forwards. Fifty per cent. of all children's elbows examined in the past year have shown this fracture. Very often it has been associated with a long splinter of bone attached to the lower fragment, but belonging originally to the back of the shaft of the humerus.

An example of this fracture is seen in Figs. 2 and 3. Mr. Jonathan Hutchinson, jun., in the 'New Sydenham Society's Trans.' for 1899, shows a skiagram of a similar case, and makes the following remarks:—"One important fact has lately become clear owing to the use of radiography. The mass of bone which is felt just above the bend of the elbow in so many cases of separated lower epiphysis and the like at the end of treatment, which is put down to excessive callus, and which so much limits the movements of the elbow, is not callus at all, but the end of the shaft which was originally displaced, and never reduced.

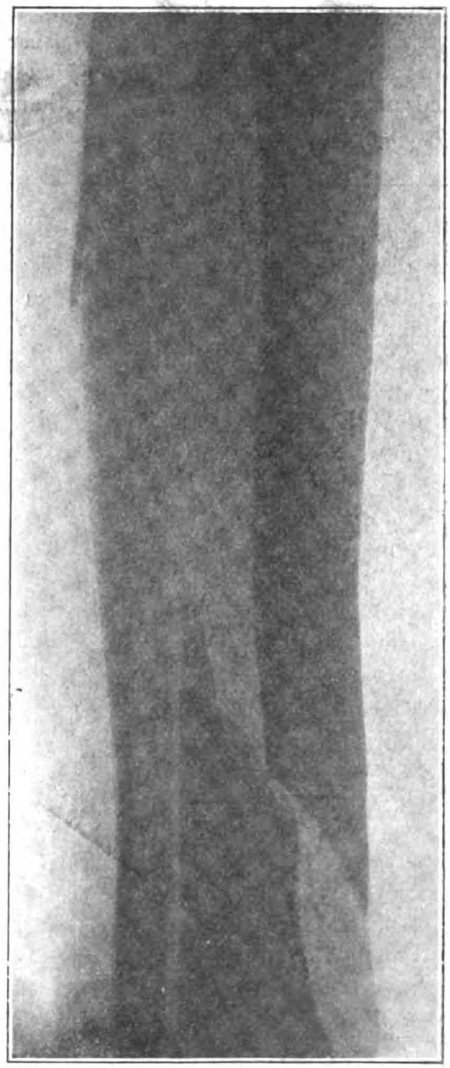

FIG. 1.—Typical fracture of tibia. Direction downwards and inwards. All but three cases of fractured tibia examined in Guy's Hospital Röntgen Ray Department in 1900 were of this description.

The accompanying figures illustrate this well. The first one shows a side view of a separated epiphysis in a boy aged five, taken eight days after the accident. The injury had been carefully

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treated from the first on a splint, and the displacement was supposed to have been corrected. The skiagram shows that the diaphysis still projected strongly, and that the projection would form a permanent obstacle to full flexion. Since it would be denuded in front of its periosteal sheath, it would be impossible for the bone here to form excessive callus. On the dead subject I have found it almost impossible to reduce such displacement as shown with manual traction, the elbow-joint being extended; and what applies to manual traction must equally apply to weight extension."

FIG. 2.—A very common fracture in a young child, frequently diagnosed as separation of epiphyses of lower end of humerus. Lateral view.

Mr. Hutchinson concludes by saying that upon fully flexing the elbow, and again skiagraphing, the epiphysis was found to have glided into almost perfect position, and that there was no difficulty in keeping it there. "Nothing," he says, "could more clearly illustrate the value of putting up such fractures in the flexed position."

Dr. Batten, of Dulwich, has told me of such a case, which he has treated by flexion with excellent results, having watched it throughout with the rays.

The condition present in a joint has upon many occasions been demonstrated. Apart from such obvious lesions as dislocation and fracture, it has been possible to show the presence of fluid and other slight pathological conditions. In two cases where the presence of loose bodies were suspected these were shown to be present. Fluid

FIG. 3.—Antero-posterior view.

is shown by a blurring of the outline of the joint surfaces, which can best be estimated by comparison with the joint of the opposite side. Early cases of tubercle in joints have shown this want of definition so constantly that it seems highly probable that where a clear decided outline of a joint can be obtained, either upon screen or negative, no tubercular process can be present.

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More advanced tubercular process has been evident by the amount of disorganisation present. Fig. 4 represents a hip, and it is very apparent that a great deal of destruction has taken place in the joint. Curiously enough, this case clinically presented no very definite signs of hip disease. Several such cases have come into this department. One was a knee which had but a few weeks' history, and had been diagnosed as acute arthritis. The ray examination showed every evidence of tubercle, and much disorganisation of the joint structures. Subsequent excision proved that this supposition was correct. The general appearances of a tubercular joint at this stage have been observed to be—

1. A general want of transparency as compared with the opposite healthy joint.

2. A ragged edge to the bones in place of the normal regular outline.

3. Luxations.

The early examination of a tubercular joint has saved time in the treatment of the patient, as it has been possible to see whether there has been hope of saving the joint by rest, or whether a more radical mode of treatment has been called for.

It is obvious that in these cases the rays should only be used in conjunction with other surgical methods of diagnosis, as has previously been suggested. Fig. 5 shows a congenital dislocation upon the left side. Though the condition is so very obvious in the picture, the case presented certain difficulties before the radiograph examination which had led to the suggestion of hip disease of the joint of the other side. Tubercular disease in bone has been chiefly manifested by the amount of damage done to the fine structure of the cancellous tissue. Thus the photograph of a tubercular tarsus is disappointing in appearance, owing to the want of definite outline to the individual bones before mentioned, and the loss of the fine detail of the bone structure which adds so much to the beauty of a normal skiagram.

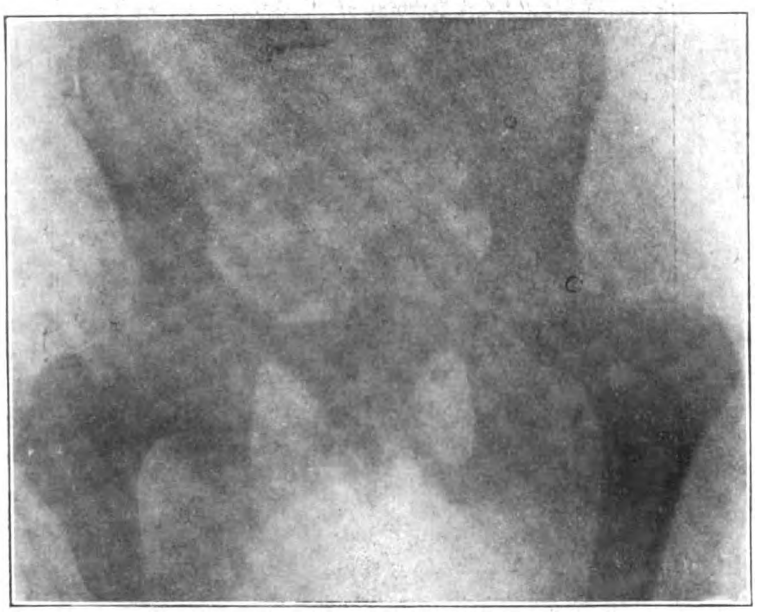

FIG. 4.—Tuberculous disease of left hip-joint, previously undiagnosed.

Other diseases affecting bone which have come into this department can be roughly divided up into those which obstruct the rays more than normal, and those which allow the passage of the rays by destruction of the bony tissues. The latter, as endosteal sarcoma, have been evident by clear spaces in the otherwise opaque bone substance.

The former, those which are accompanied by a new growth of bone, chiefly affect the periosteum, and include any form of chronic periostitis, periosteal sarcoma, etc. The increase of opacity is

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only noticeable after the process has been at work some time, and the new bone has become infiltrated with mineral matter. If examined at an earlier date, although considerable thickening can be felt, it may not be possible to see the least trace of any abnormal material beyond the bone outline.

In the case of a very slow-growing sarcoma situated upon one of the tarsal bones, it was observed to have a pedicle and a branching structure, due to the process of ossification that was taking place.

The last subject to be considered, but one which is full of interest, is the detection of renal calculus by the Röntgen rays.

A great deal of advance has been made in the last few months towards making the diagnosis of this complaint more satisfactory. For years the renal calculus was the philosopher's stone of radiography. It would be interesting to know how much time and material have been expended upon its discovery.

Upon ten occasions it has been possible to see a calculus in an adult subject upon the screen, in

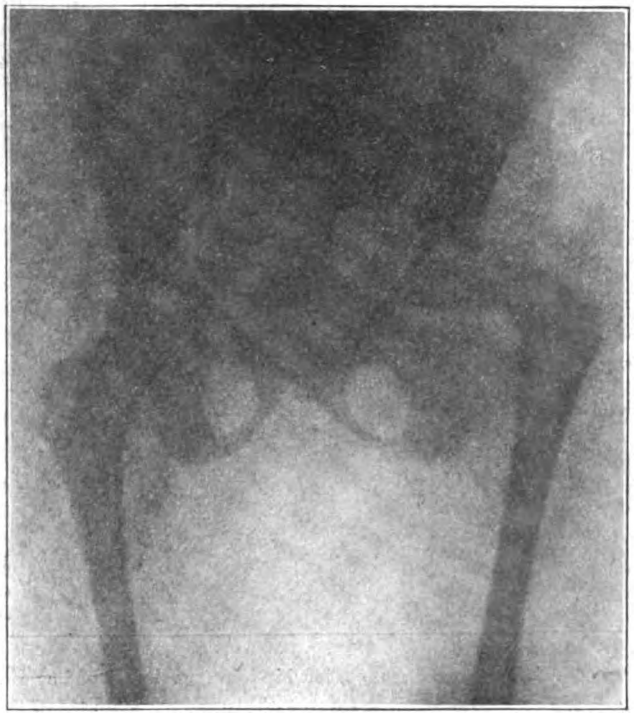

FIG. 5.—Congenital dislocation of left hip-joint. Diagnosed as tubercular disease of right hip.

A case in which the rays proved of value was one where a thickening of the shaft of the femur in a young man had led to the diagnosis of sarcoma. From the Röntgen-ray appearances, it was suggested that the condition was one of chronic periostitis, a long narrow line of new bone being visible, and the appearance presenting none of the usual characteristics of sarcoma to the rays. This suggestion has proved correct, and the limb has been allowed to remain on. A second examination some months later showed a uniform thickening of the shaft of the femur.

most cases so clearly that one felt confident of its presence. A great deal of this improvement has been due to the improved form of tube: but I believe also a certain measure is due to the greater familiarity with the screen appearance of the abdomen, whereby an abnormal opacity, though it be but a faint shadow, will strike the observer. It is now generally known that of the ingredients of urinary calculi the most opaque is oxalate of lime, the most transparent uric acid and urates, and that phosphates come about midway. On account of the comparative rarity of pure uric acid stone, and

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the frequency with which a fair amount of other more opaque salts are mixed with it, most stones of sufficient size are demonstrable by the rays. The smallest stone that has been seen upon the screen in this department measured a quarter of an inch in diameter. The stone shown in the left kidney in Fig. 6 was clearly visible upon the screen; it was composed of uric acid and oxalate of lime.

Most cases of suspected renal calculus sent to this department have not decided histories, and it is generally required that a decision shall be come to between calculus or tubercle of the kidney.

bowel have been evident in their anatomical details. The ascending and descending colon are the portions most usually seen. The stomach when distended with gas shows very distinctly, and presents a clear outline. The effect upon the screen is as if a large hole had been cut through the patient. In one case in which this condition was present, the effect was rendered still more striking by the presence of a large black calculus immediately below the greater curvature. Fig. 7 shows a calculus apparently in the bladder, but in reality in the ureter behind the bladder.

It is as well to remember the possibility of this

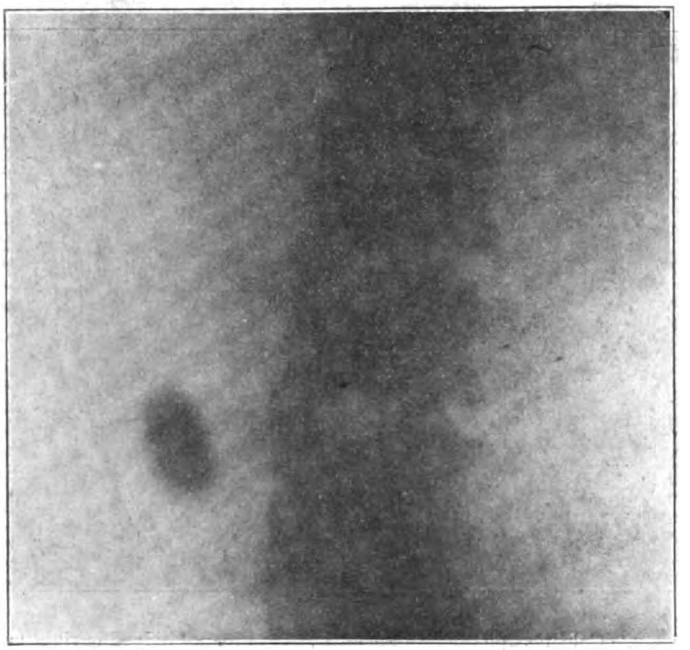

FIG. 6.—Calculus in left kidney. Seen well upon the screen.

In three cases where the balance of opinion was very much in favour of tubercle the rays have shown calculi. Upon several occasions it has been necessary to examine the patient three separate times before a stone could be made manifest. There seems little doubt that various conditions of the intestine obstruct the rays differently, and that an examination may not be satisfactory at one time, which at another will be completely so.

In connection with this, it has been noticed that when a quantity of gas has been present in the intestines the abdomen has been rendered much more transparent, and that various portions of the

state of affairs, for twice in the past year one has stated that a calculus was in the bladder when it has been in the ureter. For the detection of vesical calculus the uses of the rays have been limited. They have, however, been of use.

1. Where the patient would not submit to other forms of examination, or where his condition rendered it inadvisable that instruments should be introduced into the bladder.

2. Where the sound had not disclosed the presence of a stone, although the symptoms suggested the possibility of one being present.

In cases where a good screen and photographic

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image has not shown the presence of calculus, it has not been often that one has been found by subsequent operation. One stout man, the subject of pronounced symptoms of renal calculus, was examined twice, but no indication of stone was made out. He was operated upon, however, and the kidney found to be moveable, but otherwise normal. The symptoms disappeared after the operation.

It seems quite possible that in cases where the stone is very small, or of pure uric acid, that it would be easy to miss it, and it is therefore best to merely state that no stone can be seen, rather than say that none is present. In examining patients the subjects of urinary calculus, they thus better definition obtained, or pressure made over the position of this body has shown the spot to be more sensitive than surrounding regions.

Most of the exposures in the cases of successfully detected renal calculus have been under twenty seconds; none have exceeded thirty seconds. It is obvious, therefore, that there are no cases of the much-dreaded dermatitis to record.

Mention should be made of the normal set of skiagrams kept for reference in the department, and the uses to which these have been put. These photographs are mounted in optical contact with glass, and where it has been necessary hurriedly to indicate the presence of a foreign body for the sur-

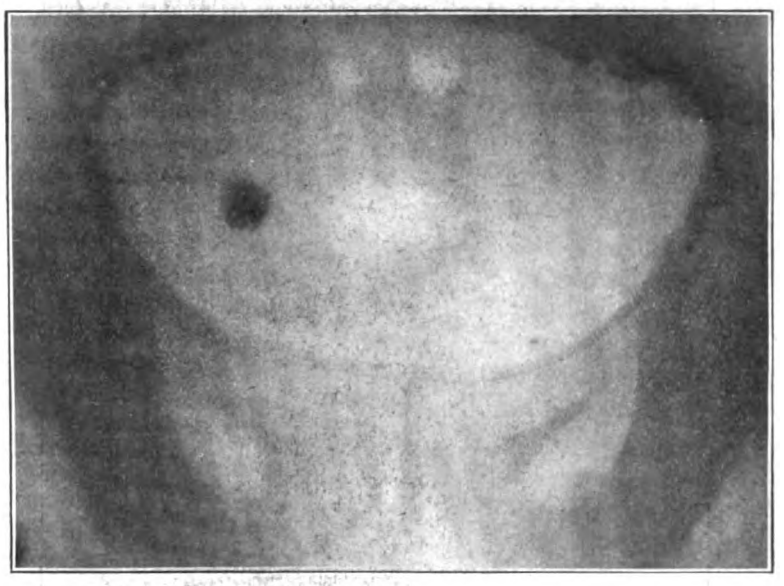

Fig. 7.—Calculus apparently in bladder, but in reality lodged in right ureter.

have been placed in the prone position and the tube kept in the middle line, and moved during the examination from the chest to the pelvis. By this means a very comprehensive view of all the situations of a calculus are obtained. This position has been found to slightly diminish the opacity of the abdomen, probably by the weight of the body lessening the antero-posterior, and increasing the lateral measurement. Slight pressure with the screen upon the gluteal region will also assist in rendering the bladder region more transparent.

Combined screening and palpation have upon many occasions given assistance. A suspected body may be pushed up against the screen, and geon's use in the wards or theatres, or where it has been desirable to convey the position of a fracture, and time would not allow of the photography, a pencil that will write upon glass has been used, and foreign body or fracture drawn upon the glass over one of these skiagrams of a normal part. In similar cases a rough tracing of the screen picture has been made upon a piece of plain glass placed upon the observers' side of the screen. Such rough and ready methods have often been sufficient, and have saved time and photographic material. This concludes what must appear to be a singularly unclassified summary of the work of this department.

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PRIMARY AMENORRHŒA

(DELAYED MENSTRUATION AND PERMANENT AMENORRHŒA).

By ARTHUR E. GILES, M.D., B.Sc.Lond., M.R.C.P.Lond., F.R.C.S.Ed.,

Surgeon to Out-Patients, Chelsea Hospital for Women; Gynæcologist to the Tottenham Hospital.

ACCORDING to most writers amenorrhœa is of two kinds, primary and secondary; and the former includes cases of retained menses. For descriptive purposes a further classification is required, since, as a matter of fact, four distinct conditions are commonly included under the term "amenorrhœa." One of these conditions, that of retention of the menses, is not one of amenorrhœa, scientifically speaking, although, from the popular point of view, it is necessarily considered as such, until the true nature of the case is made out. For by "menstruation" must be understood not only the flow of menstrual fluid from the vagina, but also the changes in the endometrium preparatory thereto. In cases of atresia of the genital passage, menstruation is indicated by no outward and visible sign; but the essential periodic changes in the uterus may be going on all the time, though concealed. Hence the condition is not one of amenorrhœa, but is correctly expressed by the term "crypto-menorrhœa" (*i. e.* concealed menstruation), introduced by Mr. Bland-Sutton and myself in our 'Manual of the Diseases of Women.'

The three remaining conditions are—secondary amenorrhœa, and the two varieties of primary amenorrhœa, namely, temporary amenorrhœa (or delayed menstruation), and permanent amenorrhœa.

The classification of these conditions is therefore as follows:

A. Amenorrhœa.
  1. Primary amenorrhœa.
    (*a*) Delayed menstruation.
    (*b*) Permanent amenorrhœa.
  2. Secondary amenorrhœa.

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B. Crypto-menorrhœa.

The following definitions will serve to show the precise sense in which these terms are used.

Before the age of puberty, and after the time of the menopause, the absence of menstruation is not spoken of as amenorrhœa; hence—

A. *Amenorrhœa* means the absence of menstruation during the usual period of sexual maturity.

1. *Primary amenorrhœa* means the absence of menstruation in the case of a woman who, though above the usual age of puberty, has never menstruated.

It is clear that a case which appears to be one of "delayed menstruation" may turn out to be one of "permanent amenorrhœa," hence the terms have a prognostic rather than a diagnostic value. I shall reserve a more precise definition of these terms till later.

2. *Secondary amenorrhœa* means the temporary suppression, during the usual period of sexual maturity, of menstruation after its having been established.

A case that appears to be one of secondary amenorrhœa may turn out to be one of premature menopause, if the patient does not menstruate again.

B. *Crypto-menorrhœa* means that menstruation occurs, but its products are retained owing to atresia of some portion of the genital passages.

The subject that I wish to dwell upon now is that of primary amenorrhœa, in relation to the prognosis as to the establishment of menstruation, and to the probability of child-bearing in the event of marriage. For the proper understanding of the question it is first of all necessary (1) to ascertain in what proportion of cases menstruation is established late; (2) to determine what constitutes "late menstruation," and (3) to inquire what are the characteristics of late menstruation, what is the condition of the pelvic organs in such cases, and how far late menstruation bears any relation to sterility.

1. *The age of the first menstruation.*—In 1000 cases in which I have a note of the age at which menstruation started, the incidence was as shown in Table I.

The same thing may be expressed in diagrammatic form.

In the accompanying chart is shown the percentage frequency of the various ages in relation to the most frequent age, namely, fourteen, which is represented by 100.

TABLE I.—*Showing the Relative Frequency of Ages for the Onset of Menstruation.*

	cases.				cases.	
At 8 years	0			At 18 years	28	
,, 9 ,,	5	= 5·5 per cent.		,, 19 ,,	18	= 6·1 per cent.
,, 10 ,,	13			,, 20 ,,	6	
,, 11 ,,	37			,, 21 ,,	3	
,, 12 ,,	85	= 88·4 per cent.		,, 22 ,,	3	
,, 13 ,,	188			,, 23 ,,	1	
,, 14 ,,	211			,, 24 ,,	0	
,, 15 ,,	173			,, 25 ,,	1	
,, 16 ,,	151			,, 26 ,,	0	
,, 17 ,,	76			,, 27 ,,	1	

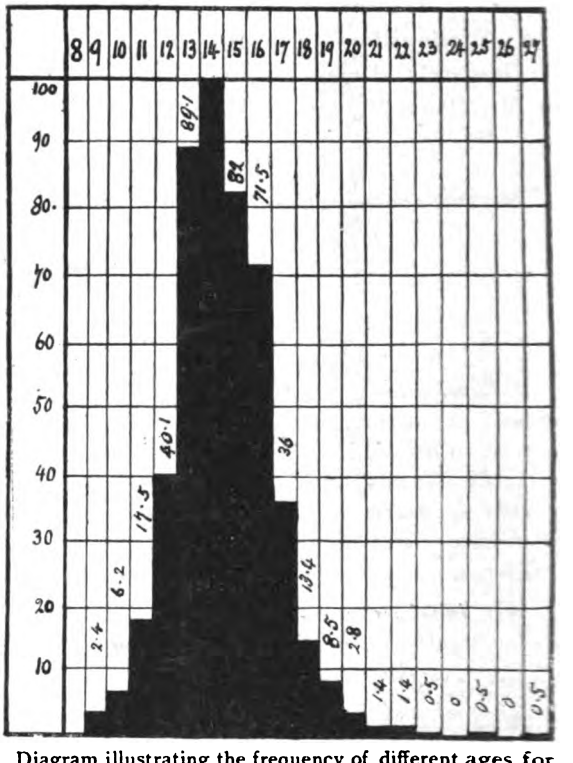

Diagram illustrating the frequency of different ages for the onset of menstruation:—the age of 14 being represented by 100.

Even with the reservation that these figures are based on the statements of patients, they may be taken to indicate fairly accurately the relative ages.

It will be seen that in 88·4 per cent. of cases girls begin to menstruate between the ages of twelve and seventeen; 5·5 per cent. begin before the age of twelve, and these may be considered as cases of "early menstruation."

2. This brings us to the second question, namely,

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what constitutes "late menstruation," and we may consider that all cases may be so described in which menstruation does not occur till the age of eighteen or later. These form about 6 per cent. of all the cases.

3. To facilitate the inquiry into the characteristics and significance of late menstruation, I have summarised all the cases of which I have notes in the subjoined Table. The two first cases are included as being both unusual and interesting.

TABLE II.—*A Table of Cases of late Menstruation.*

No.	Name.	Age.	Civil state.	Years married.	Children.	Miscarriages.	Age at 1st menstruation.	Amount of menstrual loss.	Pain.	Pelvic condition.	Remarks.
1	N. L.	22	M.	3 yrs.	0	0	17	Slight	None	Vagina normal width, but short. No cervix, nor os externum; body of uterus represented by a thickening the size of a slate pencil in the anterior vaginal fornix. Tubes and ovaries can be felt; small	Has menstruated only 3 times. First time, quantity very slight; second time, 3 months later, also slight; third time w s at 19 (? after marriage), and the quantity was about a pint.
2	M. W.	27	.	7 yrs.	2	0	17½	Very much	Bad	Normal	Labours natural. The second period was not till a few days after marriage, at the age of 20; the third period was 2 years after the birth of the first child, and 2 more periods occurred before the second pregnancy. Has had 5 periods in the 23 months since the second labour; was nursing for 10 months.
3	J. F.	30	S.	—	—	—	18½	Very little irregular	Bad	Not examined	After first menstruation, amenorrhœa for a year.
4	E. H.	21	S.	—	—	—	18	Very little irregular	None	,,	—
5	M.G .	25	S.	—	—	—	18	Very much, irregular	Severe	,,	—
6	A. A.	21	S.	—	—	—	18	Little, irregular	Much	,,	—
7	C. D.	35	S.	—	—	—	18	Moderate, regular	None	,,	—
8	M. S.	21	S.	—	—	—	18	Very little	None	,,	Generally regular.
9	J. M.	19	S.	—	—	—	18	Very little	None	,,	Has only menstruated once. Mother was nearly 19 at the first menstruation, one sister was 18, one 14, one ?.
10	M. H.	35	S.	—	—	—	18½	Moderate, regular	None	,,	Has not menstruated since the age of 24.
11	L. T.	34	S.	—	—	—	18	Moderate, regular	None	,,	—
12	L. N.	23	S.	—	—	—	18¾	Very scanty, regular	None	No abnormality found	Menstruation lasts one day, and necessitates only one diaper.
13	S. L.	31	S.	—	—	—	18	Very little, irregular	Bad	Uterus normal size; pinhole os	—
14	E. G.	25	S.	—	—	1	18	Little, irregular	None	Double pyosalpinx	—
15	M. B.	63	M.	38 yrs.	12	2	18	Much	None	Normal	Irregular before marriage regular after.

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No.	Name.	Age.	Civil state.	Years married.	Children.	Miscarriages.	Age at 1st menstruation.	Amount of menstrual loss	Pain.	Pelvic condition.	Remarks.
16	E. O.	40	M.	18 yrs.	0	0	18¾	Very much, irregular	None	Double pyosalpinx	—
17	E. K.	34	M.	?	3	0	18	Moderate, regular	Moderate	Retroversion; ovarian cyst	—
18	A. A.	59	M.	41 yrs.	5	9	18	Moderate, regular	None	Carcinoma uteri	—
19	M. C.	34	M.	6 yrs.	2	0	18	Profuse	None	Endometritis	—
20	C. R.	45	M.	18 yrs.	2	0	18	Much, regular	None	Fibroid polypus	—
21	A. L.	42	M.	20 yrs.	11	3	18	Very little, regular	Very slight	Normal	—
22	F. F.	36	M.	?	5	0	18	Much	Moderate	,,	—
23	E. J.	23	M.	3 yrs.	0	2	18	Moderate, regular	Moderate	Syphilis	—
24	M. N.	39	M.	12 yrs.	0	0	18	Moderate, irregular	Little	Normal. Uterus measures 3 inches	—
25	S. N.	33	M.	?	4	1	18	Moderate, regular	?	Normal	—
26	M. D.	26	M.	5 yrs.	3	0	18 11/12	?	?	,,	The second menstruation was on the 21st birthday. The third was a week after marriage, 7 months later; the next two followed at monthly intervals. The sixth period was six weeks after the birth of the first child, and there has been no menstruation since, although 13 months intervened between the first and second, and 2¼ years between the second and third children. Patient did not nurse the first two children, but nursed the third for 10 months.
27	E. J.	31	M.	?	3	1	18	Moderate, irregular	Moderate	,,	—
28	J. F.	27	S.	—	—	—	19	Profuse, regular	None	Not examined	—
29	A. H.	44	S.	—	—	—	19	Very little, irregular	Much aching	,,	—
30	C. N.	27	S.	—	—	—	19	Moderate, regular	None	,,	After the first menstruation there was amenorrhœa for 12 months; since then regular.
31	C. B.	19	S.	—	—	—	19	Very little	Bad	,,	—
32	E. L.	22	S.	—	—	—	19	Little, regular	Slight	Now 3 months pregnant	—
33	A. B.	22	S.	—	—	—	19	Much, irregular	Very bad	Uterus retroverted, normal size	—
34	E. D.	30	S.	—	—	—	19	Little, irregular	Moderate	Now 8 months pregnant	Amenorrhœa for 12 months after first menstruation
35	E. B.	29	S.	—	—	1	19½	Moderate, regular	None at first	Normal development; gonorrhœa	When 19½ had a great fright, from being nearly run over. The same day menstruation started, and it has been regular since.
36	E. R.	54	M.	?	2	1	19	Slight, regular	Bad	Normal	—
37	?	45	M.	?	6	0	19	Slight, regular	Bad	,,	—

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No.	Name.	Age.	Civil state.	Years married.	Children.	Miscarriages.	Age at 1st menstruation.	Amount of menstrual loss.	Pain.	Pelvic condition.	Remarks.
38	H. S.	40	M.	20 yrs.	2	1	19	Moderate	Bad	"	—
39	C. N.	64	W.	?	10	1	19	?	?	Cystocele	Never saw anything from child to child.
40	D. E.	24	M.	3 yrs.	0	0	19 1/12	Much, irregular	?	Now 3 months pregnant	—
41	M. A.	32	M.	?	4	0	19	Very scanty	Slight	Dermoid ovarian tumour	—
42	R. W.	55	M.	—	—	4	19	Little	Bad	Normal	—
43	A. K.	22	S.	—	—	—	20	Little, irregular	Bad	Uterine infantile, normal position	—
44	?	29	S.	—	—	—	20	Moderate, regular	None	Uterine myoma	—
45	G. A.	28	M.	6 yrs.	0	1	20	Very little, regular	None	Now 3 months pregnant	Quantity increased after miscarriage, and became profuse.
46	M. K.	37	M.	10 yrs.	1	12	21	?	?	Endometritis, retained secundines	—
47	B. K.	38	M.	9 yrs.	0	0	21 1/12	A mere show	Slight, regular	Uterus long and narrow. Sound takes a direction to the left for 2¾ inches, suggestive of a uterus with one horn better developed than the other. External genitals normal	Menstruation consists of "a few drops;" does not need to wear anything.
48	C. C.	34	S.	—	—	—	22	Moderate, regular	Bad	Not examined	—
49	D. C.	64	M.	?	8	1	23	Moderate, regular	Moderate	Normal	Menopause at 40, after a confinement.
50	G. K.	24	M.	4 mos.	0	0	24	Slight show	None	Uterus very small and ante-flexed; uterine cavity barely 2 inches	Had a slight show for the first time 4 months after marriage.
51	M. F.	29	M.	7 yrs.	0	0	25	Scanty, irregular	Bad	Uterus normal size	Has now seen nothing for seven months.
52	M. G.	27	S.	—	—	—	26 1/12	Very scanty	None	Pubic hair scanty; labia majora and minora small; uterus small. Os normal size	—

From this table we get the following information:

Characters of menstruation—Rhythm.—Deducting 8 cases in which particulars are not given, and 2 cases in which the patient had menstruated only once, we have 42 left, in 22 of which menstruation was regular, whilst in 20 it was irregular. Of the latter there were 4 cases in which menstruation occurred only a few times.

Quantity.—Of 49 cases in which particulars are given, in 24 the amount was very little, being described in some cases as "a mere show," or "a few drops." In 15 cases the loss was moderate; in 5 it is described as "much:" and in 5 as "very much" or "profuse.' Of the 10 patients who lost much or very much, 7 were married, and 6 of these had borne children. Of the 15 moderate cases, 8 were married, and 7 of them had borne children. The cases in which under-development was ascertained to exist are limited to the group of cases in which the loss was very slight.

Pain.—In 21 out of 47 cases there was no pain at all; in 11 it was slight, in 11 it was bad, and in 4 it was very bad.

Thus the prevailing character of late menstruation is that it is scanty, irregular, and painless.

The condition of the pelvic organs.—This is a matter of great interest in relation to late menstrua

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tion. Excluding 14 cases of single women where no vaginal examination was made, we find that among the remaining 38 patients, 25 (21 married and 4 single) were, or had been, pregnant; 7 (4 married and 3 single) had not been pregnant, but presented no objective signs of under-development; whilst 6 (3 married and 3 single) presented degrees of under-development of the uterus varying from the condition of a normal-sized uterus with pin-hole os, to a mere rudiment of the uterus, as in Case 1.

It is at first rather surprising to find that, whilst 6 cases out of 38 show under-development, 25 should be capable of bearing children. The proportion of miscarriages is, however, a large one, amounting to 37 out of 122 pregnancies, or 30 per cent. Moreover, it is clear that late menstruation is not simply a question of uterine under-development; the fault may lie, in some cases, in badly-developed ovaries. In other cases, again, the ovary may be anatomically normal, whilst the function of ovulation begins late, and is carried on infrequently. The latter explanation is the one to which we must resort to explain Cases 1, 2, 26, and 39, where menstruation occurred very infrequently; whilst it may also account for Cases 3, 30, and 34, in which the first menstruation was followed by twelve months' amenorrhœa; and for Cases 10, 49, and 51, in which menstruation went on for only 6, 17, and 14 years respectively.

The relation of late menstruation to child-bearing.—That late menstruation does not necessarily result in sterility is shown by the fact that 25 patients became pregnant out of 32 who had the chance of becoming so. This gives a proportion of 22 per cent. of sterile patients. This is a higher percentage than exists for married women in general; and, as previously stated, there was among the pregnancies an unusually high proportion of miscarriages—viz. 30 per cent.

As the age of the first menstruation rises the likelihood of the birth of living children diminishes. Thus, of 10 patients who did not menstruate till the age of twenty or later, there were 6 who married, and between them they had 9 children and 14 miscarriages.

In order to determine upon a somewhat more extended scale the relation of fertility to the age of the first menstruation, I have investigated 300 cases. To enable comparisons to be made with a fair amount of accuracy, and exclude as far as possible sources of error, the cases considered had been married at least four years, and were married under the age of thirty. They had not suffered from inflammatory conditions of the pelvic organs, such as might in themselves cause sterility.

The cases are divided into groups, according to the age of the first menstruation, and in each group the proportion of fertile, relatively infertile, and sterile cases is noted. I define as "sterile" cases that have been married at least four years without having been pregnant; for the other two classes I have adopted an "index of parity." Taking the number of years married as y, and the number of pregnancies as p, then $y \div p$ is the index of parity. Fertile cases are those where $y \div p$ is four or under, or where there have been at least four pregnancies. Relatively infertile cases are those where $y \div p$ is five or over. I do not, of course, pretend that this standard is of any value except for purposes of comparison. Further, there is an element of fallacy in the fact that in some cases means may have been employed to prevent conception after the birth of one or two children; but as this applies to all the groups, the error may be regarded as a negligible quantity when comparing them with one another. The results are shown in the following table:

TABLE III.—*To show the Relation between the Age of Puberty and Sterility.*

(Percentages are in *italics*.)

Age at 1st Menstruation.	9 to 12.		13 to 15.		16 to 17.		18 to 19.		20 or over.	
Fertile ...	50	*74·6*	100	*74·6*	60	*80*	12	*66·6*	2	*33·3*
Relatively infertile	10	*15*	19	*14·2*	9	*12*	4	*22·2*	1	*16·7*
Sterile ...	7	*10·4*	15	*11·2*	6	*8*	2	*11·1*	3	*50*
Total, 300	67	*100*	134	*100*	75	*100*	18	*100*	6	*100*

Up to the age of fifteen for the first menstruation there is little difference to be noted in the subsequent fertility. The ages of sixteen to seventeen give the best result for child-bearing; at eighteen and nineteen the relative infertility increases, and at twenty or over fertility is low and sterility high.

To sum up. When menstruation is established

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late—that is not till the age of eighteen or later,—it is usually irregular, scanty, and painless. The pelvic organs present some degree of under-development in a larger proportion of cases than is found when menstruation starts at the usual time. It by no means follows, however, that if the patient marries she will be sterile; but fertility is not so great as when puberty is established younger, and pregnancies are less likely to go on till full

of the pelvic organs was such as to lead one to expect that menstruation would be established either very late or not at all.

In this table cases of crypto-menorrhœa have not been included, although one case (No. 4) was thought to be an instance of this condition until the operation of incising the vulvo-vaginal septum showed that menstruation had never occurred.

From this table it will be seen that of nine

TABLE IV.—*A Table of Cases of Primary Amenorrhœa.*

No.	Name.	Age.	Civil state.	Years married.	Pregnancies.	Pelvic condition.	Remarks.
	L. W.	18	S.	—	—	Vagina readily admits finger. Uterus small, especially the cervical portion. Ovaries not felt	—
2	M. H.	20	S.	—	—	Pubic hair very scanty. Vaginal orifice very small; a probe passes into the vagina for 2½ inches. On recto-abdominal examination no uterus can be felt	The breasts have not developed at all, but resemble the condition in the male.
3	A. B.	21	S.	—	—	Not examined	—
4	N. H.	22	S.	—	—	No vaginal orifice; a crescentic line appears to indicate the position of the hymen. Operation. On making an incision mucus and cholesterin escaped, but no pus. The vagina was then found to be 2½ in. long; its upper half was very narrow. Uterus, and especially cervical portion, very small	For 12 months before she was seen, patient had had headache and pains in the back every month. It appeared to be a case of crypto-menorrhœa until at the operation the retained fluid was found not to be menstrual.
5	E. K.	22	S.	—	—	Not examined.	—
6	G. K.	22	M.	4 mos.	—	Uterus very small and acutely ante-flexed; sound passes barely 2 in. The vulva is very small	A few weeks after being seen, the patient stated that she had had a show. This case is therefore placed among the cases of "late menstruation;" but the probability is that it was not a true menstruation, and hence it is also included here.
7	?	28	M.	4 yrs.	0	Vulva small, vagina short. The cervix is a mere button, and the uterus is small, cavity being 1½ in.	—
8	M. W.	29	M.	8 yrs.	0	Fair development of pubic hair. Uterus very small, cavity barely 2 in. Ovaries apparently normal size	For 11-12 years has had attacks of abdominal pain about every six weeks.
9	E. G.	40	S.	—	—	Vagina admits two fingers; the pelvic organs appear to be well developed	General development normal.

term. The later menstruation starts, the greater is the likelihood of sterility.

We can now return to the question of primary amenorrhœa. For the study of the characteristics of this condition I have drawn up a table of the cases in which I have notes in which the patient had attained the age of twenty without menstruating. The first case has been included because, though the patient was only eighteen, the condition

patients of the age of eighteen and upwards, who had not menstruated, two were not examined; of the remaining seven, there were six who presented some under-development of the genital organs, especially the uterus; whilst in one case, though the patient had attained the age of forty without menstruating, no abnormality could be detected. In Case 2 the uterus was rudimentary, if it was present at all; by recto-abdominal examination

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no trace of it could be felt. Two of these patients had been married, one for four years, and one for eight years; in neither case had there been any pregnancy.

Comparing these cases of primary amenorrhœa with those of late menstruation in Table II, it is clear that, as far as the development of the uterus is concerned, there appears to be no reason why some of the former should not have menstruated, just as some of the latter did; and, as was observed in discussing the condition of the pelvic organs in the cases of late menstruation, the explanation of the total absence of menstruation must, no doubt, be sought in the function of ovulation, which in the cases of primary amenorrhœa is probably totally in abeyance.

I have not included in Table IV cases of primary amenorrhœa in patients under eighteen; these have always been regarded merely as cases of delayed menstruation, and no examination has been made; there is no doubt that in the majority of them the pelvic organs would be found to be normal. The question now arises whether the cases in Table IV are to be considered as "delayed menstruation" or as "permanent amenorrhœa." In the absence of a local examination, Cases 3 and 5, who were respectively twenty-one and twenty-two years of age, might be put down to the former category; Case 1 might be similarly classed in view of her age, though the uterus was small. Case 6 is also in a somewhat doubtful category; one would have to keep her under observation to ascertain whether the "show" which once occurred was merely accidental, or developed into a more or less regular menstrual discharge. The remaining cases may safely be put down as "permanent amenorrhœa," for in Case 2 the uterus was rudimentary or absent, and in Case 4 no menstruation had taken place into the closed vagina, although something like menstrual molimina had occurred. Cases 7, 8, and 9 may be looked on as "permanent amenorrhœa," owing to their age, apart from the under-development presented by two of them.

We can now complete the definitions whose considerations we postponed. In the light of Tables II and IV, we may say that:

a. Delayed menstruation is primary amenorrhœa in a patient of eighteen to twenty-five, whose pelvic organs are normal or only slightly under-developed.

b. Permanent amenorrhœa is primary amenorrhœa in a patient who is over twenty-five or whose pelvic organs are markedly undeveloped.

Prognosis.—From the foregoing considerations we can formulate some general principles, to guide us in giving a prognosis, when consulted in any given case on account of the non-establishment of menstruation. The two points on which we shall most probably be asked to express an opinion are; first, the likelihood of menstruation coming on; second, the likelihood of childbearing in case of marriage. With regard to the first point, the coming-on of menstruation, our forecast will depend in the first place on the patient's age. We learn from Table I that:

28·8	per cent.	of girls	do not menstruate	before the age of	16
13·7	,,	,,	,,	,,	17
6·1	,,	,,	,,	,,	18
3·3	,,	,,	,,	,,	19
1·5	,,	,,	,,	,,	20
0·9	,,	,,	,,	,,	21
0·6	,,	,,	,,	,,	22

Even without examination, therefore, we can give a good prognosis in the case of a girl of sixteen or seventeen; at eighteen or nineteen the prognosis must be more guarded, and the effect of treatment should be watched; after the age of twenty no opinion should be expressed without making an examination.

In the second place we shall be guided by the general health of the patient. If she be suffering from anæmia, tuberculosis, or other constitutional condition that may cause amenorrhœa, we shall be able to say (with the proviso of age just considered) that menstruation will probably begin when the general condition has improved.

Supposing the general condition to be good, and the patient to be twenty years of age or older, the development of breasts and pubic hair should be noted. Any marked deficiency in these secondary sexual characters is unfavourable; nevertheless, too much reliance cannot be placed on them, and an examination of the pelvic organs should be made. For this purpose it is best to give an anæsthetic, especially if the patient is unmarried. In some cases a recto-abdominal examination will give all the information that is necessary; in others a vaginal examination will be required. If no abnormality can be found, or the uterus is only slightly under the normal size, the prognosis is not unfavourable; on the other hand, if the uterus is

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very small or rudimentary, or if the ovaries are very small and infantile in shape, the probability is against the establishment of menstruation.

With regard to the forecast as to child-bearing, the question will probably only arise in the case of a patient of eighteen or over, and the first thing necessary will be to examine the pelvic organs. If these are found to be normal, we can say that if the patient be eighteen the prognosis is still fairly good; if she is nineteen and has not menstruated, she is more likely to be relatively, though not absolutely, infertile. If she is twenty or over, the likelihood of child-bearing diminishes rapidly in proportion to the age; and if she is twenty-five or older, she will almost certainly be sterile.

If, on the other hand, the uterus is underdeveloped, the uterine canal measuring two inches or less, the patient will be sterile even though she may menstruate.

Treatment.—When there is any faulty constitutional condition, this should be treated. Anæmia especially requires iron with arsenic and strychnine or nux vomica, and as the anæmia improves menstruation is more likely to be established. As to the action of reputed emmenagogues, such as manganese dioxide, potassium permanganate, senecin, etc., the results in my experience have not been encouraging. After a reasonable trial of drugs, if no result is obtained, it is usually advisable to examine the pelvic organs, preferably under an anæsthetic; for if a condition of under-development be present, prolonged drug treatment is futile, and is disappointing to the patient. Under these circumstances it is best to explain the condition and leave matters alone. Stimulation by electricity is usually undesirable and unnecessary in the case of single patients, though it may be tried in exceptional cases if the fact of amenorrhœa is a source of worry to the patient. The most effective stimulus is that supplied by marriage; this is exemplified by several cases in Table II, where the first menstruation took place shortly afterwards. Obviously, however, it does not fall within our province to prescribe matrimony as a remedy for amenorrhœa.

THE PREPARATIONS BEFORE ABDOMINAL OPERATIONS.

A Post-Graduate Lecture delivered at the West London Hospital,

By L. A. BIDWELL, F.R.C.S.,
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(*Concluded from p.* 201.)

THE preparation of the patient may be considered under the two heads of general and local.

It has long been recognised that highly nervous patients are much more difficult not only to anæsthetise, but to treat after an operation. In the same way attempted suicides always give rise to much anxiety after an operation, and, as MacCormac has pointed out, wounded soldiers suffer more severely from shock after a defeat than they do after a victory. We must therefore admit that the nervous system has an influence on the amount of shock after a serious operation; in this way undue anxiety, the fear of a fatal termination, creates an unfavorable condition, and should be combated by cheering up the patient, and by dispossessing him of the exaggerated fears of pain, sickness, or of death. In addition it is best to keep the patient quiet in bed for a few days before the operation, with the nurse who is to look after him, so that he may become accustomed to her beforehand; and finally, the friends, if anxious and indiscreet, should be kept away as much as possible.

Fertchenfeld, quoted by Shuter, states that much relief is given in cases of special nervous apprehension by the administration of strophanthus, five- to ten-drop doses are given on the last two evenings before and again on the morning of the operation. It is very important too that the patient should have a good night's rest before the operation, and should not be disturbed by any preparations. In cases of excitement, in order to ensure sleep either one third of a grain of morphia should be given hypodermically, or twenty grains of sulphonal may be administered twenty-four hours earlier.

Attention to the state of the bowels is important; it has long been a nearly universal custom to thoroughly clear out the small and large intestine by means of a purge, followed by an enema

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the day before the operation. It is, however, doubtful whether it is always wise to do this just before a severe operation, especially if the patient be in a feeble state. Some years ago I advised that a purge should be given, not on the evening before but on the second evening before the operation, and that an enema only should be given a few hours before the arrival of the surgeon.

The great objection to the use of enemata is that they produce a drainage of the tissue fluids, which predisposes to shock and limits absorption, metabolism, and excretion. In the case of œsophageal or pyloric obstruction it will be found necessary to trust entirely to the use of enemata before operation, since the obstruction for which the operation is to be done would prevent the entrance of the purgative into the system.

Under this heading, too, must be considered the question of trying to asepticise the intestinal canal, by administering antiseptics by the mouth for some days previously. The antiseptics usually employed are salol or beta naphthol; the former can be given in five-grain doses three or four times a day, and the latter in three to five-grain doses in a cachet. Though these substances undoubtedly have the power of destroying a certain number of micro-organisms in the intestinal tract, yet they apparently disturb the normal assimilation of intestinal products, in which possibly bacteria play some rôle, so it is doubtful whether their exhibition is of any real practical use. It must be remembered, too, that, in a case of pyloric stenosis they will not have any effect beyond the stomach, since they cannot be absorbed from the organ itself; and a more reliable sterilisation of the stomach can be obtained by lavage with antiseptics.

When, however, it is decided to employ them, they should be given three or four times a day for several days before the operation.

With regard to the choice of nourishment before an operation on the stomach, there is some difference of opinion, some surgeons allowing a fair amount of food by the mouth up to the day of the operation, taking care, however, for the last twenty-four hours, to give chiefly peptones and foods which leave little residue, together with alcohol or wine. Other surgeons, on the other hand, advise nothing except water or wine to be given by the mouth, while the patient is nourished by nutriment enemata two or three days before the operation.

The method to be employed, however, will depend on the case. In malignant disease, where the pylorus is permeable, it is certainly advisable to get up the patient's strength by giving absorbable nourishment, such as milk, eggs, peptones, and somatose and other meat essences. If, however, the pylorus is impermeable, it is equally advisable not to waste time by an ill-judged endeavour to build up the patient's strength by rectal alimentation, since the absorption of even peptones from the rectum is very limited, and any nitrogenous matter is liable to putrefy and give rise to rectal irritation; the substances which are most readily absorbed from the rectum are wine, tea, coffee, or alcohol. It is best, then, in such cases to perform an operation immediately, so as to allow of food being taken by the mouth. Under any circumstances in an exhausted patient, it is desirable to administer, shortly before the operation, an enema containing some peptone, and also half an ounce of brandy. Another argument in favour of giving nothing but rectal alimentation before the operation is offered by Spencer, who considers that by withholding food he allows the interior of the stomach to become aseptic by the accumulation of gastric juice.

The next points in the preparation of a patient are those directed towards diminishing the post-operative shock. But first among these is the prevention of unnecessary loss of heat, which has already been alluded to when speaking of the desirability of a hot-water tank to the operating table. To accomplish this end, also, the patient should be warmly clad, and in such a way that no large surface of the body is exposed during the operation; the ordinary pyjama sleeping suits of flannel answer the purpose admirably, since the chest, limbs, and the lower part of the abdomen can be kept covered, while the upper part is exposed. In female patients flannel drawers reaching as low as possible and woollen stockings take the place of the trousers, but the jacket can be used in both sexes. I may here remark that this clothing should always be of flannel, not of flannelette, since the latter material is of no use to keep in warmth. Some surgeons have the extremities bandaged after being wrapped in cotton-wool, but this is not necessary. Greig Smith

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advised an ingenious device to prevent exposure during the operation. An ordinary blanket is torn in horizontal slips on each side, after the fashion of a many-tailed bandage, and is placed under the patient, the tails are crossed over the whole of the patient's body and legs, only leaving exposed the area to be operated on. The blanket, of course, is afterwards covered with mackintosh and sterilised towels.

The next method of preventing shock is by the introduction of artificial serum or, as it is better known, normal saline solution. The simplest way of making this is by adding common salt to tepid boiled water in the proportion of a teaspoonful to a pint. It can be introduced into the system in three ways. First by intra-venous injection, preferably into the median basilic vein (the mode most usually employed in this country); secondly, by subcutaneous injection, the fluid being forced by means of a glass syringe into the loose subcutaneous tissues in the region of the axilla; and thirdly, by means of small enemata frequently repeated. Either of these methods answers, but the last-named is likely to produce some irritability of rectum and subsequent discomfort. The subcutaneous method is certainly the easiest and quickest to perform, but the intravenous infusion produces the most rapid effect. Whichever method is employed, from two to four pints will have to be injected. One French surgeon, Lauerstein, advocates transfusion of blood on the day before the operation; but this is certainly no more, and it is extremely doubtful whether it is even as efficacious as saline infusion.

Stewart Lewis insists on what he calls the saturation method in the management of laparotomy. He points out that all efforts used to be directed towards depriving the system of water (by purges, etc.), and so stimulating the absorptive power of the peritoneum. He points out that the drainage of tissue fluids is an unavoidable evil in laparotomy, being produced by preliminary purgation, by keeping the stomach empty to avoid ether vomiting, and thirdly, by the loss of blood. This drainage should be limited in every possible way. In the preparation of his patients, while emptying and asepticising the intestinal canal, he insists that the tissues should be fluid saturated to the physiological limit. The diet should be limited to that which will produce the minimum of either gas or toxins. Intestinal antiseptics should be employed, and several mild purgatives should be given instead of one which is either imperfect or excessive and exhausting. Two or three grains of calomel, combined with some cholagogue, should be given eighteen hours before; and six hours before the operation four quarts of normal saline should be injected into the rectum very slowly, to insure long retention. For forty-eight hours before the operation copious draughts of water are given, six to eight ounces being administered every two hours.

It only now remains to speak of the employment of morphia hypodermically, either alone or combined with atropine, or the latter drug alone. The use of atropine, I believe, is harmless; but I do not think that a preliminary injection of morphia is absolutely safe, although it certainly enables the patient to be kept unconscious with a smaller amount of anæsthetic. I have myself never given it before an operation, fearing that the ultimate shock might be greater. My opinion is based on some observations made by Professor Sherrington, who found that when he gave morphia before dividing the spinal cord of monkeys, the immediate shock was slight, but the animals all died; when, however, he withheld morphia, there was profound shock, but the animals recovered.

Under the heading of local preparation we must consider—first, the preparation of the skin over the abdomen; and secondly, that of the organ to be operated on.

The preparation of the skin demands the utmost attention, especially where portions of the intestine may accidentally rest on the skin in such an operation as posterior gastro-enterostomy. There are many modifications in the method of preparing the skin, the object of each being to render it as nearly aseptic as possible. The asepsis of the skin will not in most cases be absolute, since bacteria are lodged in the deepest parts of sebaceous glands, and it is practically impossible to be certain of clearing these out. Therefore, after the most elaborate preparation, the skin must still be regarded as a source of danger, and should be kept covered up with sterilised towels, so that no internal organ or ligature touches it. The routine which I employ is as follows:—Twenty-four hours before the operation the skin of the whole abdomen is scrubbed with soap and water; and if the patient be a hairy man, the upper part of the abdomen is

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shaved. After this the skin is again scrubbed with a flesh-brush and soap; this is washed off, and turpentine is rubbed in. Lastly, carbolic acid solution 1 in 20 is applied with a flesh-brush; a sterilised towel, soaked in 1 in 40 carbolic solution, is put over the prepared part and covered with a piece of jacconet, and kept in position with a many-tailed bandage. Immediately before the operation the skin is again scrubbed with soap and water, then with 1 in 20 carbolic, and lastly with some 1 in 1000 perchloride of mercury. The brush should not be used for any other purpose, but should be kept for this alone; it should previously have been sterilised by boiling, or by having been kept in 1 in 20 carbolic acid solution for twenty-four hours. With regard to soap, either ordinary yellow or soft soap may be used; personally I prefer, and always use, an etherial solution of soap, since the ether enables the soap to penetrate more deeply into the sebaceous glands. The removal of fat may also be effected by ether, benzine, or alcohol; turpentine, however, is preferable, since it possesses a slight antiseptic action.

Watson Cheyne recommends that the skin, in addition to the above, should be scrubbed with Lister's strong mixture, which is a solution containing 1 part in 20 of carbolic acid, and 1 in 500 of corrosive sublimate. He recommends that this should be applied also immediately before the operation, and washed off with 1 in 2000 sublimate.

Some surgeons are not content with these precautions, and recommend more extensive ones. Thus Giulot directs that the abdominal wall should be treated for three successive days by brushing with boiled water and soap, followed by alcohol and ether; after this an antiseptic dressing is to be applied until the following day. He also advises that, in order to cleanse the umbilicus, it should be thoroughly swabbed with tincture of iodine. Jessett recommends that the skin of the abdomen should be scrubbed twice a day for two days with a 10 per cent. solution of liquor potassæ, and a pad soaked in 1 in 3000 sublimate solution applied after each cleansing.

The next point in local preparation is the preparation of the stomach (or of other organ to be operated on). This will, of course, depend upon the operation to be performed. Thus, where obstruction of the œsophagus or cardia is present, no attempt at asepticising the stomach contents is possible. It will be better to consider each case on its own merits. In cases of gastrotomy for removal of foreign bodies, etc., various plans of distending the stomach have been practised. Thus Felizet, in removing a spoon, distended the stomach with vapour of ether by an ingenious arrangement. A rubber tube was passed into the stomach; at the external end it was bifurcated, one end being attached to an ether reservoir, and the other with a funnel for washing out. The stomach was first washed out with bicarbonate of soda solution, and the abdomen opened. The ether chamber was next heated, and the ether vapour distended the stomach, causing it to prolapse into the wound. Jacobi and Farler have effected distension by making the patient swallow measured quantities of acid and bicarbonate of soda; while Schomborn used a bladder attached to a hollow sound, which could be distended on entering the stomach. These methods, however, are of doubtful advantage; for not only do they needlessly distress the patient before the operation, but it is difficult to prevent the substance used to distend the stomach from coming in contact with the peritoneum when the organ is opened; secondly, they increase the difficulty of finding the foreign body; and thirdly, the point selected for incision of the stomach when distended may become rather inconveniently placed for the application of sutures when the stomach is empty after the extraction of the foreign body. The previous cleansing of the stomach by lavage with a solution of bicarbonate of soda or of salicylate of soda on the morning of operation is, however, desirable; and in order that the stomach may not be quite contracted, it is advisable to get the patient to swallow, immediately before the operation, half a pint of some innocuous fluid, such as boiled water or tea, which will throw the stomach into prominence, but will not be too much to be sponged up when the stomach is opened.

In gastrostomy the methods of artificial dilatation of the stomach are certainly inadvisable. In the first place, a patient requiring the operation is usually in a very feeble and depressed condition; and as swallowing is very difficult, the necessary manipulation will distress and worry the patient. Even if it should be possible to distend the stomach, it is doubtful whether this would be of benefit, since it is wished to fix the stomach where

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there will be the least traction when empty, not where a dilated stomach presents in the wound. It is, therefore, desirable to insert the sutures when the stomach is empty.

In dilatation of the stomach, on the other hand, there is more reason for systematic lavage before the operation, since a dilated stomach always contains a certain quantity of putrefying matter. If, however, the patient is very feeble and worn out by want of food and vomiting, it is better not to disturb him on the day of the operation, since we have already insisted on the necessity of keeping the patient quiet and free from worry prior to the operation.

On the other hand, a very large number of excellent surgeons are strongly in favour of lavage in every case before an operation of gastro-enterostomy or pylorectomy. Thus Mayland washes out the stomach daily for one week, or if there is not much dilatation, on the day before and on the morning of operation; Jessett recommends the stomach to be washed out once or twice a day for a week. Other surgeons, such as Lauerstein, Macdonald, Villard, recommend the stomach only to be washed out on the morning of the operation, and the latter recommends this to be not too long before, as in a diseased state the stomach quickly secretes mucus, with which the stomach will be found to be filled. The stomach may be washed out with 1 in 1000 solution of salycylic acid (Rydygier), with a 3 in 1000 solution of the same acid (Kocher) with 5 per cent. solution of salicylate of soda (Jessett), with boric solution (Jaboulay), or with bicarbonate of soda (Noravoch) with boiled water (Villard, etc.). Whatever solution is used, lavage should be continued till the fluid returns clear, and then if an antiseptic has been used the stomach should be washed out with boiled water finally, so as to remove any of the antiseptic which may have been left behind.

Valuable as lavage is, there are a certain number of opponents to its practice, because it certainly causes fatigue, and may predispose to shock; again, when employed just before the operation, all the fluid will not be expressed. My practice has been never to wash out the stomach before the operation, except in the case of patients who have been accustomed to the use of the stomach-tube, and to whom it gives not only no inconvenience, but actual relief. For washing out the stomach I recommend a 1 in 1000 solution of salicylic acid, followed by plain water containing a little bicarbonate of soda (a teaspoonful to a pint). In cases of operation for gastric ulcer lavage is positively dangerous, since it may cause perforation of the stomach. The same danger attaches to cases of ulcerating malignant disease.

Finally, we must insist on proper attention being paid to the hygiene of the mouth, since a septic condition of this part will influence the stomach wound, by the swallowing of pus with saliva. Not only should carious useless teeth be removed or stopped, and the teeth carefully cleaned with antiseptic tooth powder twice a day, but an antiseptic mouth wash should be employed each time after taking food. The best wash for this purpose is a 5 per cent. solution of peroxide of hydrogen, 1 in 80 solution of carbolic acid, or a solution of boric acid.

Attention has recently been drawn to this subject of oral sepsis by Dr. William Hunter,* who considers that if it be neglected it will produce septic gastritis by the swallowing of pus from the mouth. He points out that though the hydrochloric acid in healthy gastric juice has the power of destroying the micro-organisms which have been swallowed, this power is lost when, as in chronic gastritis, the hydrochloric acid is diminished in quantity, and even in health the power is feeble in the interval between meals. In operation cases, more especially those for malignant disease, where the free hydrochloric acid is very small in amount or absent altogether, the risk of septic infection in the stomach will be increased. Hunter points out, also, that oral sepsis differs from surgical sepsis, since the organisms are constantly being swallowed, and moreover it is usually connected with dead bone, which produces the most virulent form of sepsis. His directions for oral antisepsis include the immediate extraction of all diseased teeth, and before this can be done the application of 1 in 20 carbolic solution to each of the diseased teeth and adjoining gums; after this an antiseptic mouth-wash should be used. Hunter advises one made by the addition of one drachm of 1 in 20 carbolic to a tumbler of water. Patients, too, must be taught to keep their toothplates aseptic, which can only be effected by boiling

* 'Clinical Journal,' September 12th, 1900.

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every day, and dental apparatus which cannot be removed for cleaning should be avoided. This septic gastritis can also occur from the swallowing of pus from otitis, tonsillitis, pharyngitis, etc.

Lastly, we have to consider the preparations to be made by the surgeon himself; we may consider these too under the headings of general and local. The general preparation includes a healthy mode of life with some exercise in the fresh air, avoidance of fatigue, either mental or bodily, and of want of nourishment immediately before operation. Treves specially denounces the practice of carrying a heavy bag just before an operation, and also advises strengthening the muscles of the arm by dumbells, etc. Nothing need be said of personal cleanliness, since in this country it is superfluous to insist upon it. Mention, however, may be made of the necessity of the hygiene of the mouth by the extraction or stopping of any carious teeth, and the use of antiseptic tooth powder and washes. Among surgeons who wear beards or moustaches some attention should be paid to these parts beyond the usual ablutions; thus, the beard should be thoroughly douched with perchloride solution before the operation.

A word, too, should be mentioned about excessive perspiration of the face; this may be diminished by taking belladonna before operating, and must be combated during the operation by frequent wiping of the face upon a sterilized towel by an assistant or nurse, who must not be allowed to touch any instrument or sponge. Excessive perspiration of the hands is a rare condition, but should in my opinion be considered as a bar to the performance of abdominal operations.

The clothing of the surgeon is of importance; his arm should be bared by rolling up his sleeves, and his outdoor clothes should be completely covered by a mackintosh apron or overall; but as this cannot easily be rendered sterile, I prefer to use over this an apron made of towelling which has been sterilised and soaked in 1 in 20 carbolic. If this is not at hand an ordinary large sterilised carbolic towel should be used.

The main preparation of the surgeon, of course, concerns his hands and arms, and too much care cannot be directed to these. The method of disinfection of the hands varies with different surgeons. Cheyne recommends that the hands should first be washed thoroughly with soap and water, then soaked in turpentine, then scrubbed with a nail-brush with soap and Lister's strong solution. The process should last at least ten minutes, and when complete the hands should not be dried on a towel, but immersed in 1 in 2000 perchloride of mercury. If a dry towel be used, there is fear of again infecting the hands. Lockwood divides the preparation of the hands into three stages, first the hands are prepared for disinfection, then they are disinfected, and finally, the disinfectants are washed away with dilute chemicals. First rings should be removed, and finger-nails trimmed as short as possible with knife or scissors, then the hands and arms are scrubbed with soap and hot water for three minutes: this not only removes dirt, but extracts grease from the follicles, in order that disinfectants may penetrate. Soft soap is recommended for the purpose, since a 1 in 1000 solution of soft soap has been found by Kocher to prevent the development of anthrax spores, and probably acts the same way with other bacteria. For disinfection a 1 in 500 solution of biniodide of mercury in 75 per cent. rectified spirit is used; a little water and iodide of potassium must be added to dissolve the biniodide; ordinary methylated spirit is equally efficacious, but not so pleasant. The hands and forearms are soaked in this for only two minutes, since he thinks a longer soaking may be harmful. Finally, the spirit and iodide are washed off in a watery solution of biniodide of mercury of the strength of from 1 in 2000 to 1 in 4000. Greig Smith recommended that when the hands had been soiled by a septic case, the surgeon should clean his sponges according to Borham's plan; in the course of the cleaning the hands would become thoroughly disinfected.

The method I adopt is to scrub the hands and arms with a flesh-brush and ordinary yellow soap: after this the hands, and especially the nails, are cleaned with an antiseptic ethereal solution of soap. The washing should take five minutes; after this the hands are soaked for another three or five minutes in a 1 in 1000 solution of perchloride of mercury.

With regard to the nails, most of the writers on aseptic surgery recommend them to be trimmed as short as possible. I do not, however, think that this is desirable, since the sensitiveness of the finger ends is diminished by having the nails too

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short. I consider that they should be about one sixteenth of an inch long; when not longer than this there is no difficulty in cleansing them with ethereal soap. The best plan is: After cleaning them with a knife or other special cleaner, to wash the hands with soap and water for some time, and then to again remove any loose or sodden epithelium from under the nails with a cleaner. The disinfection is completed by scrubbing with ethereal soap and water.

Owing to the difficulty in rendering the hands sterile, several surgeons have recommended, and used, gloves during operation. These gloves in aseptic cases are of cotton or fine silk; they are sterilised before use by boiling, and are soaked in antiseptic solution after being put on. In septic cases india-rubber gloves are recommended. Personally I cannot agree with their use, since, in order to ensure the rapid performance of an intestinal suture, nothing should be done which interferes with the acuteness of the sense of touch in the fingers. In passing stitches according to Halsted's method, when the needle is pushed in by the pulp of the index finger, the end of the needle would probably constantly catch in the gloves.

To conclude this lecture, I must refer to the special preparation to be made in other abdominal operations. In operations on the uterus and the appendages the vagina should be douched twice daily with an antiseptic solution (1 in 2000 sublimate) on the two days before the operation, and the rectum requires careful emptying. With regard to shaving the pubes, I do not think that this is necessary in every case, since it is often much objected to by the patients. It must, however, always be employed in cases where drainage may be necessary. In all pelvic operations, too, the catheter should be passed before the operation, even though the patient may have just passed urine, since the patient may have lost the power of emptying the bladder; and a distended bladder, when not expected, may cause embarrassment to the surgeon. There are no special preparations to be made before operations on the liver, kidneys, or intestines.

A WEDNESDAY CONSULTATION AT ST. GEORGE'S HOSPITAL.

JANUARY 16th, 1901.

MR. BENNETT.—This young man, a man-servant, comes for advice on account of deformity, following upon what appears to have been a Pott's fracture, which occurred in June last; and it is difficult to know what to do with it. He has extreme valgus and rectangular fixation at the ankle. Perhaps a certain amount of good might be done by dividing the tendo Achillis, but it would, I fear, be infinitesimal. You can easily see that the whole foot is displaced backwards. No skiagram has been taken, as he has only to-day come under observation. I do not think, however, that a skiagram would help us, as the condition is so obvious. The question I wish to submit is whether in your opinion it would be justifiable, or likely to be useful, to do any extensive operation with the view of replacing the foot in its normal site. My own impression is that such a course is hardly practicable. It would be a very severe business as an operation, and I am not at all sure that it would be possible to effect any good in the condition in which the bones at present are. I have no objection, however, to take him into the Hospital and divide the tendo Achillis. Treatment of the valgus is out of the question, as it is mainly secondary to the pressure of the lower end of the tibia, in its abnormal position, upon the tarsus. The patient finds it impossible to go up and down stairs with anything like a proper gait, and he cannot walk without pain and stiffness after he has been on his feet a good deal. The peculiarity is being noticed by his employers, and this is the principal reason of his coming for advice. There is a difference in the measurement from the malleolus to the point of the heel in the two feet of nearly three quarters of an inch, which represents the degree of backward displacement of the foot on the injured side. Dorsal flexion is non-existent, but some compensatory movement has been developed in the transverse tarsal joint. He has had massage, and exercises very thoroughly, but no benefit worth mentioning has followed.

MR. JAFFREY.—I think he would be slightly improved by division of his tendo Achillis. He

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can get about fairly well, and I do not think the larger operation would do him much good.

Mr. DENT.—I do not think he would get any good from division of the tendo Achillis even; and I should not advise doing anything more radical, such as excision of the astragalus.

Mr. BENNETT.—The man is not altogether discontented with his state, but wants to know whether we can improve it by operation. I am of the same opinion as Mr. Dent, viz. that no material good will come of tenotomy; and I think it best to advise the patient to leave matters alone for, at all events, three months longer. The only operation that occurred to me, beyond division of the tendo Achillis, was the one mentioned by Mr. Dent—excision of the astragalus, which is an excellent operation in suitable cases,—but I think this foot is in too useful a condition to justify that. It would result in a certain amount of shortening, and there is the possibility that after the operation the man might not be able to get about quite so well as at present.

Mr. JAFFREY.—This man is a compositor, and has been attending Brompton Hospital for some chest trouble. When examining his left apex it was discovered that there was a swelling about two inches to the left of the middle line at the root of the neck. The patient had been complaining of pain in the left arm. If you examine the case you will find there is a swelling in the region of the seventh cervical vertebra; and it has been thought that it was a cervical rib. But it is growing rather quickly, and one can feel pulsation over it and below the clavicle. This pulsation is due to a normal subclavian pushed forward. He has lost a considerable amount of power in the left arm, and there is a great deal of pain. He is losing weight. I have had skiagrams of it taken twice, but they do not reveal much. The man wanted to know whether operative treatment would be of any use. He has been on iodide of potassium for a considerable time, but without any result. The skiagram did not show a high rib; the skiagram simply shows some ill-defined mass there, and one could not say what it was. The man does not appear to have been aware of the tumour until it was found on examination. It is reported that there is some pulmonary mischief. I do not know what his chest condition is. His wife is suffering from carcinoma, and ever since the swelling was discovered in his neck he has thought that he is suffering from some form of malignant disease.

Mr. DENT.—One should know the chest condition first, and the knowledge of that would very largely determine what I should do in the way of advising an operation. My impression is that there is no growth whatever there, and that if you were to cut down upon it you would find it extremely difficult to make out what had been throwing the nerves forward and outward. I remember a case which looked exactly like that, in a patient about the same age, where there was a great suspicion of aneurysm. The man had so much pain that ultimately it was cut down upon. The artery was strangely superficial, but it was almost impossible to say what was pushing it forward. All that could be found was a little thickening about the rib, which was cut away. Whether that thickening had caused the pain I do not know, but ultimately the man got perfectly well, and remains so now, and he can move his arm as freely as before. He was a great athlete, and appeared to have got the trouble from over-use of the arm, I believe in punting, of which he was very fond. I think it would be quite justifiable to cut down upon this part to verify the condition. I should associate the condition with his occupation; but if there is found to be any phthisis or any other serious trouble, I should not do even that. I do not think that there is any growth at all, and I do not believe iodide of potassium would benefit him.

Mr. BENNETT.—These swellings suddenly discovered about the root of the neck are generally very obscure, and to this rule the present case is no exception. My impression is that here there is not a growth. Had it not been that the skiagrams show nothing in the way of an extra cervical rib or large transverse process, I should have thought that the existence of one of these would explain the swelling. If the man's lungs are sufficiently sound it would, I think, be right to cut down upon the part in order to ascertain what the condition is, so that if there is nothing serious the man may be satisfied that such is the case. The fact that his wife is the subject of cancer, probably suggests to him possibilities which he would not have thought of otherwise; so I should explore the tumour on that account alone even if the treatment were not indicated for other reasons.

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A CLINICAL LECTURE

ON

TUBERCULOUS DISEASE OF THE KNEE-JOINT.

Delivered at St. George's Hospital,

By A. MARMADUKE SHEILD, M.B., F.R.C.S.

GENTLEMEN,—The subject of the lecture this afternoon is tuberculous disease of the knee, and it is suggested to our minds by the case of a man in Fitzwilliam Ward, who recently had his knee-joint excised for tuberculous disease. I thought I would commence the lecture by making a few general observations upon this affection of joints, before proceeding to the consideration of disease of the special articulation which we shall speak of this afternoon.

In the first place, tuberculous disease of articulations such as the hip, knee, elbow, spine, sacro-iliac synchondrosis, and so on, are amongst the common diseases of the poor and the rare diseases of the rich. The reason of this is not far to seek. Defective sanitation, over crowding, absence of light and air, and infection, especially in large cities, has, of course, everything to do with the production of tubercle in the lungs, and also in the joints. Thus the frequency of tuberculous disease of joints in the low parts of London, and in large cities generally, must not be taken as a criterion of the frequency of disease among people who live in more favoured conditions. Yet the amount of tuberculous disease of joints which occurs in the poor in country villages is very striking, and the reason is, no doubt, over-crowding and defective sanitation. You may have a village in a fairly healthy locality, and yet you may find tuberculous diseases of all kinds very common. A large family will crowd, perhaps, into one room; the ventilation is insufficient, and infection is likely to occur. I mean that if one tuberculous person sleeps in a crowded room, the other inhabitants of the house or houses may become infected with the disease; and thus it is not surprising that tuberculous disease of joints

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or lungs is common with people who live under such insanitary conditions.

The next consideration we may discuss is why tubercle attacks the joints at all. First of all, of course, there is the anatomical peculiarity of the synovial membrane. Here is a structure which is very vascular, with a large quantity of blood passing through it, the texture and ultimate circulation of which is very fine, and in which, therefore, organisms are exceedingly likely to be arrested. The synovial membranes are, also, exceedingly prone to slight injuries, and in no joint, perhaps, is this more common than the knee. The knee is likely to be bruised or to be exposed to cold, and therefore the power of resistance of the synovial membrane is lessened; and if the tuberculous organism is circulating in the blood, it is likely to be arrested there, and so produce the pathological changes we shall presently touch upon. Another very common local tuberculous disease of joints is an inflammation resulting in caries or necrosis near the epiphysial line. You know in all joints close to the articular end of the bone is the epiphysial line—a very vascular part of the bone, where micro-organisms may be readily arrested, and may produce very baneful influences. When these parts are exposed to causes which lead to loss of the resisting power of tissues, such as exposure to cold or blows, and particularly the conditions of ill-health which follow the specific fevers—such as scarlet fever, measles, and typhoid,—tuberculous mischief may ensue. Therefore you see both the anatomical peculiarities of the joints, and exposure to various external conditions and influences, are important predisposing causes.

I will next give you a general sketch of the pathological changes which commence in the joint as a consequence of tuberculous disease. You will remember what I say now applies to any joint in the body, whether it be the elbow, the knee, the hip, the spine, or elsewhere. The disease generally commences in the synovial membrane, which becomes thickened and chronically inflamed; and the products of inflammation, instead of being organised, undergo a fatty mucoid change, so that you find the membrane perhaps an inch thick, and converted into a substance which has long been likened to boiled calf's head. Throughout the synovial membranes you may find caseating abscesses varying in size. They are due to the death and fatty change of inflammatory products. Wherever the synovial membrane encroaches on the cartilage, inflammation spreads to the latter structure, so that you get the cartilage eroded, as it is termed—that is to say, the cartilage cells are softened, and then fall into the joint, leaving the bone bare and exposed beneath, or covered with unhealthy granulation tissue. The process is shown beautifully in several of these specimens. This specimen shows destruction of cartilage under the patella and under the articular ends of the femur and tibia, where the synovial membrane encroaches. We have now got so far in the progress of the malady as thickened condition of the synovial membrane and caries of the bone-ends. The next event which happens, if nothing is done to counteract the mischief, is, that the disease drags on its long, weary course, and one or more abscesses form in connection with the carious bone in the joint, and these burst externally. The discharge is thin and "oily" in nature. The ligaments may be softened,

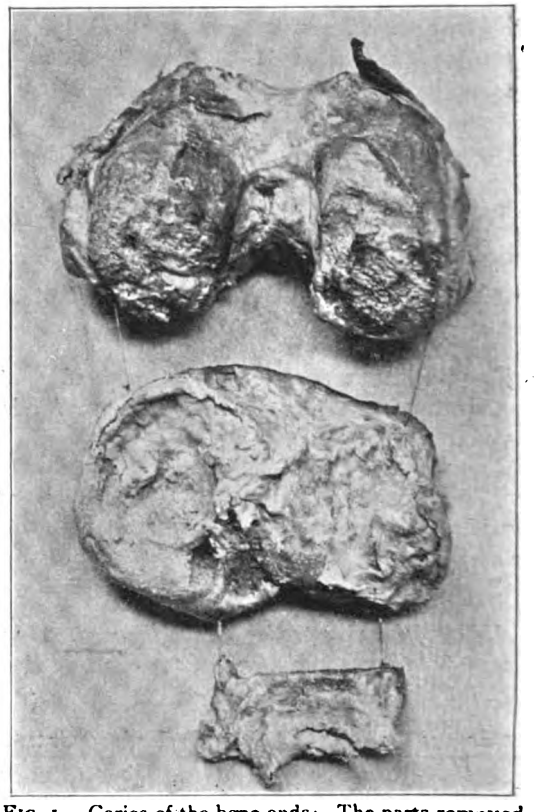

FIG. 1.—Caries of the bone ends. The parts removed in excision of tuberculous knee.

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and the bone-ends entirely displaced. If such a case still persist, unaided by surgery, as is common among children of the poor, the constitutional conditions of general tuberculosis, or "waxy disease" which affects the liver, intestines, spleen, and other viscera, are certain to come on. So these patients may die of exhaustion, with hectic fever, or they may have general tuberculosis affecting the lungs, meninges of the brain, and the like. This is a rough sketch of the process of tuberculous disease in a large joint when it commences in the synovial membrane. In a certain number of these cases, as I pointed out, the disease begins in the bone, especially at the epiphysial line. And in such instances the course of the disease is somewhat different to what happens when it commences in the synovial membrane. When the disease begins in the growing part of the bone, near the epiphysial line, the joint is only affected secondarily. You get severe aching pain and disturbance about the joint, and the end of the bone in the neighbourhood enlarges, and sooner or later the mischief shows itself in the neighbourhood as a fluctuating swelling—a subacute or chronic abscess,—and this, when opened, is found to lead down to extensive caries of the bone. Sometimes an abscess may form in the bone itself, and this may subsequently burst into the joint and disintegrate it. There are some good specimens in the Museum to show this most serious condition. So it may be said with truth that tuberculous disease occurring at the epiphysial end of the bone is a far more serious matter than tuberculous disease of the synovial membrane. For I need hardly point out to you that in cases which these specimens illustrate, where the bone-ends are extensively diseased near the epiphysial line, with large areas of necrosis and caries, with abscess in the bone perhaps burrowing into the joint, are highly unfavourable for any other treatment than amputation.

A most important consideration in a diagnostic sense is, that these changes which I have pointed out to you, more especially the synovial changes, are as chronic as they are inveterate. They take months or even years to run through their slow changes. Comparatively seldom do we meet with anything like acute tuberculous change in the joints, though there are exceptions to every rule, and I have experienced such. Seldom do we get that intense pain, fever, and disturbance of the system generally, which is so familiar to us in the acuter diseases of joints, such as acute septic osteomyelitis, necrosis, and so on. If I were asked one of the leading symptoms of tuberculous disease of synovial membranes, I should say the chronicity of the changes; they are very slow and inveterate.

I have mentioned two places where tuberculous disease of joints starts, that is to say in the thick-

FIG. 2.—Tuberculous abscesses in a long bone, one of which burst into the knee.

ened synovial membrane and near the epiphysial line of bone. The question may arise, Does tuberculous disease ever primarily originate in cartilage? The answer is in the negative; primary tuberculous disease in cartilage is not known to me, except in disease of the intervertebral discs of the spine. In some museum specimens you will find evidence of tubercle starting in the intervertebral discs.

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That is due to the fact that these discs do not consist of true cartilage, but have a central pulpy substance, remains of the notochord.

Next, you will ask me, Does tuberculous disease ever begin in the shaft of a bone? It is rare for tuberculous disease to attack a long bone in the centre of the shaft. There is only one exception, and that is in the tuberculous disease of the phalanges and metacarpal bones of the fingers and toes. It is not uncommon in dirty, ill-cared-for children, to see the phalanges of the fingers and toes swollen out into spindle-shaped oval swellings, constituting what is known as tuberculous dactylitis. If you examine such a case you will find the periosteum and shaft of the phalanx or metacarpal bone is thickened; and if you saw it open you would find in the centre of the bone probably, a caseating abscess or necrosis, with destruction of the centre of the little bone.

Lastly, tuberculous disease seldom begins in the ligaments, though I have heard pathologists affirm that they have been able to verify its commencement in the ligamentum teres of the hip.

It follows from what I have said, that tuberculous disease of joints, if allowed to run its own course, seldom or never gets spontaneously well. The unhappy ultimate results are displacement of joints, sinus, abscess, with hectic temperature and exhaustion; there may ensue general tuberculosis, or local tuberculosis of parts, like the testes, or bronzing of skin and supra-renal disease. Tubercular meningitis, or in some more rare cases abscess of the brain, may supervene, and, lastly, lardaceous disease of the viscera. It is very exceptional for these joint affections, if untreated, to ankylose and get well, therefore they are very troublesome and serious cases.

Having given you a general sketch of the pathological changes, and their general effects upon the joints, we may next turn our attention to the articulation which we are especially discussing to-day, namely, tuberculous disease of the knee. It is so common that it may be well taken as a type of tuberculous disease of all the joints. The knee, from its large size, and the great extent of its synovial membrane, and from its frequent implication in slight injuries and sprains, is the one usually affected by tubercle. I told you it was a common affection among the poor and a rare affection among the rich; but you must remember that these cases do occasionally "crop up" in private practice. I have often thought that when a delicate child begins to get a tuberculous joint, nurtured perhaps in a beautiful country house, with everything for its good, infected milk is usually at the bottom of it. You may find that the child has been fed with milk from a tuberculous cow. Cows, if crowded in insanitary cow-houses, get this disease just as freely as human beings, and their milk may infect the children of the neighbourhood in wholesale manner. I merely offer you this as a suggestion. Recollect it is a point you must investigate in private practice.

We have naturally next to speak of the symptoms. The early symptoms may be termed the stage of invasion. This stage is marked by very little indeed. There is slight effusion of fluid usually, and slight warmth of the joint, with pain and lameness. The child or young adult affected is nearly always "delicate"; very often an exceedingly pretty child, the typically beautiful child with a clear complexion, fair hair, blue eyes, and long eyelashes, often the most intelligent of the whole family. If in a patient of this kind should arise slight swelling and discomfort about the joint, always take alarm. Slight pain, lameness, and effusion, probably means the invasion of inveterate tuberculous disease, and it is very important to recognise it.

Now the age of the patient immediately strikes us. As I say, the condition is generally found in young people, that is to say, children and young adults; it is much more rare in elderly people. This man in Fitzwilliam Ward who has had his knee excised is an exception to the general rule. He has had tuberculous disease of the joint at forty years of age. You may even meet with the disease beyond the age of fifty. Tuberculous knee in the invasion stage is too often not taken seriously. The limb may be rested in a splint only temporarily, or perhaps it will be rubbed with the inevitable liniment. Then, as the mischief advances, comes the gradual obvious thickening of synovial membrane, and swelling of the joint. The thickened synovial membrane may be definitely felt to form the bulk of the swelling. And this, perhaps, is the leading diagnostic sign of tuberculous disease, that, as a rule, the swelling of the articulation is due to synovial thickening, and not to effusion. The pain gradually begins to increase,

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and every time the patient walks upon his leg it becomes more painful, and fluid effusion is superadded to synovial thickening. As months or years roll on, the next change will be signs of destruction of cartilage; that is to say the pains will become violent, and there will be the well-known agonising jumping of the limb at night. This is due to the spasmodic contraction of muscles rubbing the inflamed bony surfaces one against the other. This symptom is far more marked in acute septic arthritis than tubercle. I have frequently known extensive destruction of cartilage and caries of bone to occur in tuberculous knee with the minimum of pain. So that no one could credit what destruction has actually occurred. This especially occurs in chronic cases. Still later on an abscess may form and burst, with a subsequent sinus, and the emaciated patient will soon be full of pain and misery, and exhaustion, and "lardaceous disease."

FIG. 3.—A knee-joint affected with tuberculous disease of its synovial membrane.

Now I have told you that the chief sign of tuberculous disease of joints is thickening of synovial membrane, and this is true. Yet curiously enough there is one kind of tuberculous disease of joints which is characterised by enormous distension of synovial membrane with fluid. I believe this is the affection which used to be called hydrops articuli. The knee is sometimes excessively distended, appearing like a bladder filled with fluid. This affection is hard to diagnose from the distended and disorganised knee, which accompanies bad cases of tabes. If you open a knee of this kind you will find it full of sero-purulent fluid, and often containing a large number of those curious little objects known as melon-seed bodies. They will come out in quantities when the incision is made. They are little masses of lymph, smoothed and rounded by mutual attrition, and some have their origin in hypertrophied synovial fringes, which become pedunculated and ultimately detached. The synovial membrane may be covered with little pedunculated masses. Remember this is a very rare variety of tuberculous knee, and I only mention it to you for examination purposes. It is unlikely you will see the disease in private practice.

Such are the leading symptoms of tuberculous knee. Now are there any conditions for which it may be mistaken? Here we enter upon some exceedingly serious considerations. Unfortunately this affection is too often mistaken in practice for so-called rheumatism. The term rheumatism, like the cloak of charity, covers a multitude of sins! There is no pain or ache about a joint to which this term has not been at some time or other applied. But if a child has a pain or slight swelling about his knee, and begins to limp, and you call the affection rheumatism, you will not stand very well with the parents if tuberculous mischief ultimately ensues. Therefore remember to be a little careful about using the term "rheumatism." The diagnostic signs of rheumatism from tubercle are these:—Rheumatism in the young practically never attacks one joint only; in this disorder there are nearly always several joints affected. Then rheumatism is more acute, more rapid than tuberculous mischief; rheumatism is associated with fever; and, above all things, the salicylates have a marked beneficial effect on any articular manifestation. Rheumatism in young persons does not come on with small and slow beginnings, such as tenderness and achings, and little effusions of

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fluid—the usual inveterate onset of tuberculous mischief. The distinction between the two diseases is usually perfectly clear.

Now let us pass on to another affection, which is of still greater importance than rheumatism. Recollect that a certain number of cases of inveterate disease of joints, associated with thickenings of synovial membrane, are due to syphilis. You will, of course, ask me at once, is there any way in which you can certainly diagnose a syphilitic from a tuberculous joint? There are only two distinctive features of a most deceptive malady. You may be able in a syphilitic joint to feel gummatous masses in the synovial membrane. I have felt gummata as large as nuts quite distinctly in these instances. The second point, is that in syphilis, the periosteum of the ends of the bones is generally inflamed and tender. If you get a case of chronic joint disease associated with tenderness on pressure near the bone-ends, and nocturnal pains, beware; it is probably a syphilitic case. The thickening of the synovial membrane, and the onset of the pain in syphilitic joints may be exactly simulated by tubercle, and I do not know that there is any certain sign distinguishing between the two in that respect. But if you keep it in your mind that chronic joint disease with thickening of synovial membrane may be syphilitic, you will not be likely to fall into error. Of course in a child the signs of congenital syphilis are usually easy enough to recognise. You see the depressed nose, the keratitis of the cornea, the notched teeth, the deafness due to nerve lesions. If such a patient as this gets a chronically diseased joint, the administration of iodide of potassium will work wonders; and with this remedy is usually combined mercurial applications, with strapping and bandaging. And now I am going to make what may seem to you a very curious statement. I told you that chronic tuberculous disease of the knee was not very common in private practice, but chronic syphilitic disease of the knee is not by any means so rare as you may, *a priori*, think. I have seen a considerable number of such cases. They may occur in married ladies in whom the signs of disease are absent or very slight. A woman may marry a syphilitic man and get a slight infection, which may pass without notice. There may be some slight sore throat and a rash in the skin, which has never been interpreted or detected. The whole matter passes away, and nothing more is heard or thought of it until many years have passed. And then this lady will present herself with chronic disease of her knee, and that, being treated by the well-known Scott's dressing and iodides, will get entirely well. And do not think that congenital syphilitic disease of the knee is always marked in children by gross signs—I mean notched teeth, badly developed nose, and so on,—because many people with congenital syphilis have really exceedingly slight symptoms of the malady. But there is one test above all others which is important, the use of the ophthalmoscope. Most cases of congenital syphilis have changes in the choroid. I have seen inveterate cases of joint disease get well from the application of anti-syphilitic remedies, which have been suggested by ophthalmoscopic appearances, and therefore I urge you to make use of this means of observation, which is very important in such cases. Remember, also, that if you get a chronic case of knee-disease in people of good family, it is at least as likely to be due to the syphilitic virus as to tuberculous disease, and some of the greatest successes in practice have been made owing to the prudent and quiet recognition of this fact.

The treatment for a case of joint disease supposed to be syphilitic, is to treat it with that well-known Scott's dressing which I have already mentioned, and give iodide of potassium internally. I have no doubt that the supposed efficacy of that Scott's dressing in chronic diseases of the joints is largely due to the mercury it contains; at any rate, though old, it is a remedy of the very greatest value.

So much for remarks the importance of which I cannot dwell too much upon, regarding the differential diagnosis between syphilitic and tuberculous diseases, and the way in which they simulate one another. Among the other chronic affections of the joints which simulate tuberculous disease, I may mention that well-known affection chronic rheumatoid arthritis. This can be recognised by the remarkable grating and crackling on movement which is so characteristic of the disease. The bone-ends are generally "lipped" and deformed. The malady generally occurs in elderly people who have been exposed to wet and cold. There is in this disease no pulpy

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thickening of the synovial membrane, which is so characteristic of the tuberculous affection. I have known gonorrhœal joints mistaken for tuberculous; but this should not occur, because there is not synovial thickening here, and the patient is almost always a young man, and the history of onset is far more rapid than that of tubercle. Probably in a few weeks or months there will be considerable effusion into the joints, and the tendency to ankylosis is very marked. You will inquire whether there is a cause for the condition, in the urethra.

Of course you should hardly mistake tuberculous joint for the joint affection of locomotor ataxy, for in the latter signs of ataxia are prominent. Neither should you compare tuberculous disease with loose bodies in the joints, if you recollect what I told you about tubercle being a chronic inveterate disease, associated with great thickening of synovial membrane.

Now we come to what you are all waiting for, a sketch of the treatment of these cases. When you diagnose tuberculous disease of any joint, the first thing you have to take into consideration is the question as to whether the patient is able to carry out any treatment thought needful. Indeed, these cases may be divided into two broad classes. The tuberculous knee of the private patient is treated on what is called the expectant plan. In the case of well-to-do people you do not immediately say the knee has to be scraped out or excised. There is an immense deal to be done in these cases apart from "heroic" operations. Two of the first essentials in the expectant treatment of tuberculous joint disease are fresh air and sunlight, and I do not know which is the more important of the two. Near London the locality I select is the east coast, Ramsgate or Westgate. But if your patient be wealthy, I think it is better to order a sea voyage, so that the benefit of the sea air shall be had perpetually. The air should be brought in contact with patient night and day. Matters should be so arranged that the patient is never shut up in a "stuffy" room with the windows shut. I cannot tell you the extraordinary efficacy of this treatment alone in the case of tuberculous joints. If you have only seen the progress of a joint treated in London in the case of poor dirty people, the open-air treatment would surprise you. The next important matter is absolute rest to the affected joint. The part should be put up in an appropriate apparatus. You cannot have a better splint than that which is on the table for your inspection, a Thomas's splint; it is one of the best appliances you can use. The "patten" on the opposite boot keeps the affected limb from the ground, and the patient gets about on crutches, a matter of no small moment to children. Another excellent apparatus is a leather splint made by a good instrument-maker; it should fit very accurately.

Is there any medicinal treatment which is useful for these cases? Everything that nourishes the patient should be given. Such individuals will probably develop strong appetites from living in the air in this way. Cream is essentially beneficial, and it should be given in large quantities, and this and milk are generally liked by children. The only remedy you can give them internally is cod-liver oil, which may be combined with small doses of iron. Cod-liver oil and maltine is also a valuable preparation. All these things can be given judiciously, combined with a good dietary. Alcohol may only be given in moderate quantities, and I am old-fashioned enough to give the preference to old port or bottled stout over any other alcoholic beverage.

Now recollect you can put no limit of time to this treatment; it will certainly be months, it may be years. In very early cases the process will cease, and the joint recover. In more advanced cases such a happy result may not ensue. Should an abscess form, it must be opened, curetted, and dressed with iodoform, and in perpetual sea air the sinus will almost certainly heal. Any focus of carious bone which can be reached can also be removed with the curette, and the process can be repeated should fresh abscesses form. In this way ankylosis may finally be brought about; and recollect that the best position is that of slight flexion, not of extreme extension. In very few cases treated in this way will more extreme operations, as erasion of the knee, excision, and still less amputation, be required. Indeed, the latter operation is now, even in hospital practice, seldom performed for tuberculous knee, unless there be very extensive bone disease associated.

Before taking leave of this part of the subject, I must again insist upon the time and trouble that must lavishly be expended upon these cases, if expectant treatment is to have any chance. And

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should excision or erasion ever be performed on private patients, recollect that as soon as the wound has healed it is well to get them up in a fixed splint, and let them move about in sea air. I would even go further, and prefer to operate upon these cases at the seaside rather than in London. A patient lying in bed in a London house is badly situated for that activity of repair and organisation of tissue so essential for complete recovery and bony ankylosis after such an operation as excision of the knee.

You can easily see how among the poorer classes the expectant treatment is at best most difficult to carry out. It is usually attempted in the earlier stages at all events. Thus leather or other splints are supplied by charitable funds, and the child may get short periods at convalescent homes, and absorb large quantities of cod-liver oil preparations at the public expense. It returns from the convalescent home much improved, and on returning to its miserable habitation and environments again relapses. It is readmitted to another hospital, and again improves, and again gets worse. Ultimately abscess forms, and operative treatment is no longer postponed.

Indeed, operative treatment is usually needful in tuberculous joint diseases of the poorer classes. In what does this consist? It may be broadly stated that once tuberculous disease has thoroughly established itself, and especially if there be signs of suppuration, operation should not be delayed. One of the first important considerations is the extent of disease in the bones, and whether the whole disease can be removed by excision or erasion. This can often be only definitely settled by opening the joint, permission being given to amputate should the bone disease be extensive. In no cases is the selection of operation more difficult than in these. Speaking broadly, amputation is to be advised (1) in cases of bad bone disease implicating the joint (Fig. 4); (2) in cases associated with tuberculous disease of the lungs; (3) in instances of lardaceous disease of the viscera; (4) in those exhausted by hectic fever, emaciation, and bedsores; (5) usually in adults over the age of forty.

Excision or erasion, on the contrary, are to be preferred in young and vigorous subjects. The more the disease is limited to the synovial membrane and articular surfaces (Figs. 2 and 3), the more favourable are the prospects for excision.

The operations of excision or erasion are described in your text-books, and I do not propose to occupy your time with what you can readily acquire for yourselves. I would only make one or two general remarks on some especially important points. In a child, or young adult before the age of twenty, great care should be taken not to inter

FIG. 4.—Tuberculous caries and necrosis of the tibia secondarily affecting the joint, and demanding amputation.

fere with the epiphysial lines, if possible. Scooping out areas of carious bone, and slicing away cartilage, are often better than the cutting away large masses of bone with the saw. At the same time no pains must be spared, lest the fatal error occur of leaving a focus of disease behind in the articulation. The next point is one which may give rise to differences of opinion. In cases of operation for tuberculous knee, when synovial

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membrane is cut away, piece of carious bone scraped, and so on, I have never seen a good and useful articulation, so far as mobility is concerned, ensue. Such limbs almost always get chronically flexed and contracted. I have seen cases shown as mobile limbs after this operation, but the parents confessed to me that they always had to wear splints, to stop the knee from "bending up"! Hence I assert, that it is always wise to aim at firm ankylosis in a good position after any such extensive operation upon this articulation.

Next let me emphasise a point which is often entirely neglected in the management of these cases. The great and essential consideration in all cases of operation on the knee where ankylosis is required, is absolute fixation and immobility from the time of the operation.

A very common practice is to move these cases off the splints, every time the dressings are reapplied. Without reckoning the pain caused by the "starting of the bone ends," and the alarm and crying of young patients, such movements are most inimical to union, and I believe are largely responsible for failures in these cases. The principle of fixation and immobility from the base of operation was firmly fixed in my mind by the late Sir George Humphrey, who used to perform many excisions of the knee. So impressed was he with the necessity of this measure, that his cases were never even dressed, but were enveloped in carbolic oil and wool, and bound securely on a long back splint. When the dressings were removed, at the end of six weeks or two months, the local conditions would have shocked a strict disciple of Lister! Yet, though all principles of antiseptics were disregarded, and though symptoms of sepsis often showed themselves, firm union of the bone ends occurred in the vast majority of the cases which I witnessed.

This principle of fixation has happily been improved upon by Mr. Howse, of Guy's Hospital, and I must take the opportunity of saying that his splint and method of fixation by waxed bandages quite revolutionised my own practice in excision of the knee. You have an excellent opportunity of observing its beneficial effects in the case of the man who forms the subject of this lecture. You observed how the bone ends were held one against another, and how the limb was easily placed in a swing cradle, and how the dressings were daily removed with no pain or discomfort whatever. This apparatus is one of the "good things" of surgical practice, and I am surprised it has not met with wider acceptance.*

After any extensive operation upon the knee in tuberculous cases, where firm ankylosis is needed, remember to keep the limb supported by a strong leather splint long after apparently firm union takes place. Twelve months is not too long a time for this, and neglect of this precaution leads to many of the unsatisfactory results we witness among the children of the poor in London and large cities.

It remains that I should speak to you about some other methods of treatment. Firstly, the congestion treatment suggested by Professor Bier, of Kiel. It is founded on the idea that tubercle does not flourish in parts supplied by venous blood, and it is carried out by inducing stasis of the parts about the joint, by the application of an elastic bandage above and below the articulation. It is obvious that this measure can only be used before abscess or sinus occurs. I have tried it, but I am not strongly prejudiced in its favour.

Next, it has been advocated that iodoform emulsion should be injected into the tuberculous tissues. I have read treatises on the subject and have given the method a trial. Again I have been disappointed. I now confine the injection of iodoform emulsion (1 in 10), entirely to sinuses and abscess cavities. In like manner, the application of sulphur must be conducted with care. It is a powerful escharotic, but a local remedy of great value when applied moderately and carefully to carious bone, or diseased foci. The injection of Koch's tuberculin is not now much employed, at all events in this country. Finally, let me sum up the matter by telling you, that if you employ the same climatic treatment for tuberculous joints as for tubercle in other parts of the body, you will never regret the practice.

BETA-NAPHTHOL has been found of such great service in cases of gastric fermentation, diarrhœa, and dysentery, that Messrs. Burroughs Wellcome & Co., in view of its pungent taste and slight solubility in water, have brought the drug out in the form of three-grain "tabloids."

* "Excision of the Knee," 'Guy's Hosp. Rep.,' 1893.

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WITH DR. LAURISTON SHAW IN THE OUT-PATIENT DEPARTMENT AT GUY'S HOSPITAL.

Among the cases seen by Dr. Lauriston Shaw at Out-patients on a Friday afternoon lately the following were of special interest:

A boy æt. 14, somewhat pale, and rather spare, was sent up on account of a cough and wasting of one month's duration. He had not noticed any blood in the sputum, and stated that although his present attack of cough had only existed for a month, he had for many years been subject to attacks of cough and expectoration during the winter. The notes made by the clinical clerk drew attention to the facts that there were increased vocal resonance and prolonged expiratory murmur at the right apex, but no impairment of resonance, nor any adventitious sounds. The clerk suggested a diagnosis of early phthisis at the right apex.

Dr. Shaw, after examining the patient, stated that he found the physical signs accurately described, but did not concur with the conclusion drawn therefrom. He impressed upon the class the importance of recognising the normal difference observed in auscultating the apices of the two lungs—the difference in size and distribution of the right bronchus led to the breath-sounds and voice-sounds being more clearly transmitted at the corresponding apex. Hence increased bronchophony and prolonged expiratory murmur noticed here as compared with the left apex must not incline the observer to suspect consolidation. In fact, the absence of any difference in these particulars between the two apices is a more suspicious feature than its presence. In the patient under examination the absence of any difference in the expansion and in the percussion resonance of the two apices, and the freedom from râles and rhonchi must lead to the statement that there are no physical signs of phthisis. But this is by no means the same thing as saying there is no phthisis. It cannot be too carefully remembered that phthisis gives no physical signs in its earliest stages, at the period, that is to say, in which it is most certainly curable. If you wait to make a diagnosis until definite signs are observable, you will generally wait until the prospect of complete cure is small. In the case under observation Dr. Shaw pointed out that the existence of a long-standing winter cough without any physical signs was against a diagnosis of tubercle. The fact that the boy had suffered rather more lately than in former years, and that he was pale and thin, might be explained by the fact that he had lately begun to work for his living. He was engaged as a paper-folder, and stated that he worked in a room with a number of other boys, and that the paper was full of dust. The evil influence of dust in keeping up bronchitis and inducing other more serious changes in the lungs was commented on, and the boy's parents were strongly advised to try and find him some more healthy occupation.

Another patient was a night porter at a London club, on duty each night from 8 p.m. to 8 a.m. He had been feeling unwell for some months, and had had frequent attacks of nasal catarrh. A few weeks before he had had influenza, and the medical attendant under whose care he then placed himself had suggested to him that he had better give up night work.

He came to seek further advice on this subject. On examination he was found to have very poor muscular development, with a flat chest and slight lateral curvature of the spine. The only abnormal physical sign observed in examining his chest was a systolic bruit at the apex. Most of the members of the class recognised this bruit and noted that it was inconstant. The explanation offered by those who heard it was either that it was a hæmic bruit, or that it was functional or due to dilatation of the heart. No one seemed to have specially noticed its relation to respiration, although the heart's action was regular. Dr. Shaw pointed out that this was a serious omission. An inconstant systolic apical bruit associated with *irregular* action of the heart was usually due to mitral regurgitation, and the inconstancy was explained by the variable power of the ventricle's contraction. But where the heart was *regular* the inconstancy was generally found to have a constant relation to the respiratory rhythm, and the conditions producing the bruit varied according as the bruit was best heard during *inspiration* or *expiration*. If best heard during *expiration*, viz. when the heart was uncovered by lung, the bruit was made in the

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heart, but was of such low intensity that it was inaudible through the layer of lung covering the organ when the chest was expanded. Such a bruit might or might not have serious importance according as it was hæmic or due to mitral regurgitation.

The inconstant bruit heard best or only during *inspiration* was never of importance. It was generally called a "lung" bruit, and was thought to be due to the impact of the heart upon the adjacent lung, the actual sound being probably produced within the lung-tissue, and perhaps being an interrupted inspiratory breath-sound. The bruit in the patient under observation was of such a character.

This and the former case, taken together, Dr. Shaw said induced him to impress upon those present the importance of recognising slight variations from normal physical signs which must be regarded as peculiarities of the patient, and, as having no pathological significance. It is no doubt a serious thing for your patient that you should overlook any indication of disease. It is perhaps a more serious thing to persuade a perfectly healthy person that he is the subject of phthisis or heart disease. The neglect to appreciate lung bruits, and the normal difference between the right and left apex, leads many good lives to be refused insurance, and induces many healthy persons to regard themselves as life-long invalids. A case was instanced in which a patient with a lung bruit had for twenty years nourished the idea that she had heart disease, and had become so attached to her invalid ways that she was unable to benefit by the knowledge that she had no organic lesion. The evil effect of telling a neurotic patient that he was suffering from a weak heart or delicate lungs was often incalculable. Students while still at the hospital should listen to as many healthy chests as possible, in order to become familiar with the wide variations from so-called normal sounds which were consistent with perfectly healthy viscera.

Turning again to the patient under discussion, Dr. Shaw protested against the habit of employers keeping individual workmen constantly on night duty. Arrangements could generally be made, as in hospitals in the case of nurses and porters, for alternate spells of day and night work. The air in London was probably purer during the night than in the day, but the absence of the invigorating effect of the sun was a serious matter. The patient was advised to look out for some more healthy occupation, but was told that there was no serious danger in continuing in his present work until he found something more suitable. The importance of developing his muscles was pointed out to him, and he was ordered a tonic mixture containing iron and strychnine.

A gardener about 55 years old came complaining of constant tremor of his left hand and arm, which had troubled him for eight months. In all other respects he was perfectly healthy and was able to do his work. He stated, however, that after an extra hard day his left arm was very painful, and that the constant movement when in bed interfered with his getting off to sleep. The peculiar movement of his fingers upon his thumb (like pill-rolling), and the fact that the movement was temporarily arrested on the patient grasping anything firmly, were so characteristic that the class immediately made a diagnosis of paralysis agitans. The question was asked whether it was not unusual to find one hand only affected after eight months, and it was pointed out that, though the disease might affect a second limb in three months, it often remained isolated for two or more years. In searching for other symptoms of the disease, the patient was asked if his friends had noticed any alteration in his expression, and he stated that they had not. When, however, the frequency of an expression of melancholy in the subjects of this disease was being commented on, the patient volunteered the statement, "Before my illness I was very merry, but now I can never even smile." He denied any sensory symptoms, such as the feeling of heat, so often described, and presented no peculiarity of gait. The patient said his doctor had told him there was no cure for the disease. Dr. Shaw said he was afraid he must agree with the statement, but he believed he had seen temporary improvement produced by arsenic, which was accordingly prescribed. He thought that bromides and electricity, which had been much praised by some, usually proved ineffectual. The morbid anatomy of the disease was at present quite unknown.

A lithographer æt. 58 was sent up for an opinion by a medical man, who suspected malig-

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nant disease. The patient was engaged at home upon his work for many hours each day, and rarely went out of doors. With the exception of constipation he had enjoyed good health till three weeks ago, when he began to suffer from abdominal pain, which had persisted, and been occasionally accompanied by vomiting. He had been unable to eat, and was wasting. He was very pale, and had a puffy face suggestive of Bright's disease; but his pulse was of low tension, and his urine had a specific gravity of 1030 and was free from albumin. On examination of his abdomen his liver was found to be slightly enlarged and somewhat tender. No tumour was to be felt. Questioned as to his bowels, the patient said they were opened every two or three days, and that his motions were like a "sheep's." Dr. Shaw said that this condition of fæces was very unlikely to exist with malignant stricture of the bowel, which usually resulted in semi-liquid motions between the intervals of obstruction. On hearing from the patient that he drank so small an amount of fluid that he was nicknamed by his friends "The rabbit," it was pointed out that this fact and his sedentary occupation were quite enough to account for his constipation. It was suggested that the long-standing constipation had interfered with his digestion, and set up congestion of his liver, conditions that would explain his abdominal pain and vomiting. The acute onset and short duration of his symptoms made carcinoma of the stomach unlikely; the extreme pallor which had probably led his doctor to suspect malignant disease might reasonably be attributed to his indoor life. A report to this effect was sent to his doctor, who was advised to urge the patient to get out of doors and to take more fluid with his food. A prescription of cascara sagrada and nux vomica with liq. bismuthi et ammon. cit. was proposed.

A domestic servant eighteen years of age was sent up by a doctor, suffering from considerable œdema of the legs. Both legs were very swollen, and pitted easily on pressure; there was no albuminuria, and no abnormal sign in the heart except a systolic bruit in the pulmonary area. The patient was somewhat anæmic, and there were venous hums audible in the veins of the neck. Dr. Shaw said that although the œdema was greatly out of proportion to the other signs of chlorosis, he had no doubt that it must be attributed to this cause. It was important to recognise that a moderate amount of anæmia might be responsible for a very excessive development of one or other of the conditions usually dependent on it, such as headache, dyspepsia, or œdema of the legs. Unless the chlorosis was recognised as the cause, and properly treated, the prominent symptom could not be cured. Rest—not necessarily in bed, but chiefly in the horizontal position—for at least a month was advised for the patient, and she was ordered an iron and arsenic mixture, to which were added five minims of digitalis, to be taken thrice daily.

Use and Abuse of Potassium Iodide in Ophthalmic Practice. — Baker states in the 'Journal of the American Medical Association' of November 17th, 1900, that:

1. Iodide of potash should generally be administered in rapidly increasing doses until from 1 to 500 grains is given daily.

2. The drug should always be given after eating, and well diluted with water.

3. Frequent hot baths are essential to the best results in the use of the remedy.

4. Not infrequently large doses will be tolerated when smaller ones cannot be well taken.

5. The use of the large dose is not limited to syphilitic cases.

6. Large doses are indicated in optic neuritis, ocular paralysis, choroiditis, serous iritis and relapsing iritis, cyclitis, and interstitial keratitis.

7. It is contraindicated in grey atrophy of optic nerve and in most cases of post-neuritic atrophy.

8. Albumin in the urine, generally speaking, is a contraindication for large doses of iodide.

9. Young children do not take the iodide kindly, and it should be administered cautiously.

10. The remedy is of doubtful value in early syphilitic iritis.

11. Large doses are of doubtful utility in the removal of post-operative exudates, but should be given further trial.—*Therapeutic Gazette.*

In the case of a cabdriver who had accidentally swallowed a set of teeth, plate and all, the X rays showed a pulsating shadow of the ingested object in the œsophagus where it passes through the diaphragm. In the act of swallowing the teeth could be seen to rise about an inch.

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A THURSDAY CONSULTATION AT ST. BARTHOLOMEW'S HOSPITAL.

JANUARY 17th, 1901.

MR. D'ARCY POWER.—I am showing this patient for Mr. Willett, at his request. She is thirty-five years of age, and seven or eight years ago she noticed a swelling just below the lobule of the ear, which she attributed to cracking nuts with her teeth, but she did not suffer any inconvenience from it. The swelling has gradually increased, but it is still movable from the inside to the outside of her mouth, and it does not involve the orbit nor depress the hard palate. Behind the ascending ramus of the jaw there is in addition a firm swelling about the size of a walnut, which can be moved under the skin It depresses the soft palate. The left wall of the pharynx is bulged inwards by the swelling, but there is no obstruction to breathing. The glands under the angle of the jaw are enlarged. There is no bulging in the orbit or from the antrum, or downwards into the hard palate. Mr. Willett is rather inclined to look upon it as a fibroma or adenoma of the palate, although he does not state definitely where it grows from. He wishes to ask his colleagues first as to the nature of the growth; and secondly, whether any operation is advisable, and if so, whether it should be done from inside the mouth or outside. I may say, as far as my own opinion goes, I should be inclined to think it started as a fibroma, but that it has become sarcomatous, and is now probably a fibro-sarcomatous growth. I should be inclined to attack it from the outside.

Mr. LANGTON.—It is difficult to state exactly what is the form of disease in this case, as it is not a common one. The disease involves the whole of the left side of the pharynx and the soft palate, but does not involve the hard palate at present. Clearly the mass in the neck has solidarity with the faucial tumour, and one can move it from side to side bimanually. I should regard this as a fibro-adenomatous growth, but I should not be surprised if it has now undergone some sarcomatous infiltration. I think in a woman of thirty-five, apparently in good health, in whom the disease is fairly localised, I should recommend operation, but not from within the mouth, as septic absorption is not unlikely to result. The disease can only be removed by a large operation, somewhat on Kocher's method. I should advise the performance of tracheotomy or laryngotomy first, as it is not unlikely that the mucous membrane over the tumour will be divided before the operation has been completed.

Mr. BUTLIN.—I think in all probability it is a tumour beginning in the palate. Whether the external swelling is a secondary effect of the gland involvement I do not know, nor whether it is continuous disease with the primary tumour. These tumours are now classed as endotheliomata of lymphatics or blood-vessels. I do not know whether this is malignant now. I have seen them of much longer duration than this one, and sometimes under these circumstances they shell out in a remarkable manner. Sometimes, indeed, big operations have been done where there was no reason to do anything except make a cut and shell the tumour out. I should not begin by doing a big operation; I should first of all do a laryngotomy, put a sponge at the back of the throat and expose it by a cut in the mucous membrane, and see whether it would shell out from the inside.

Mr. LANGTON.—There are large glands, too.

Mr. BUTLIN.—You cannot do anything with regard to the glands until you find out what the condition is.

Mr. BOWLBY.—I think it is a very doubtful tumour. I cannot ascertain that it is definitely attached to the palate; it seems to me to spread inwards and push the mucous membrane up from the side of the pharynx, and feels as if it encroaches inwards from without. It seems to me to be subcutaneous practically in one part, and I would explore it on that side first. I do not think it is very fixed, and I believe it may shell out; I should like to be guided by what I found by an incision from the outside first. I would not do a laryngotomy if I explored it from the outside.

Mr. D'ARCY POWER.—The history is very indefinite as regards the interior of the mouth: she does not know when it began inside her mouth.

Mr. LOCKWOOD.—I think it is a growth which began outside and spread inwards. I cannot make up my mind that it began in the parotid gland, but I think it now involves that gland. I see no reason to suppose that it is a malignant

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growth; it has a clear distinctive outline, it can be moved, and the tissues over it can be moved quite easily. I believe it is a growth which can be removed. I should endeavour to do that from the outside, and my reason for that would be that if you can do it without opening the mouth it would be an advantage; you would have a wound which is not infected, and you would be able to get away the outlying pieces: I do not know whether those are prolonged portions of the growth or enlarged lymphatic glands.

Mr. BUTLIN.—Here is a woman on whom I performed an operation for removal of the breast. She is thirty-nine years of age, and I operated eighteen months ago. At the present time she has several scattered nodules, one of which is fixed. It began on the edge of the scar, and it has made its way to the bone and become fixed to it. It is visible from a distance. Three inches from that is a little tiny nodule, and there is a small gland above the clavicle. That is recurrence after a very complete operation, and, as usually happens in such cases, if there is any recurrence at all it is not within the reach of operation, or operation is not likely to be a success. From an operative point of view I regard her case as hopeless, but I wish to raise the question whether one would not do well to remove her ovaries. In the first place she is thirty-nine years of age, and thirty-five to forty years of age is supposed to be the best period of life for that procedure. In the second place she has no sign of any visceral disease, and her general condition is good. She has no disease of bones, except so far as this nodule has become adherent to the bone and is beginning to work its way into it. I have advised her to have her ovaries removed, and I want to know whether my colleagues agree with me.

Mr. LANGTON.—I think these cases of recurring mammary carcinoma are very interesting, especially from the experimental point of removal of the ovaries, which has been so much discussed of late years, for inoperable breast cancer or for inaccessible cancer elsewhere. I agree with Mr. Butlin that this is one of those cases of inoperable cancer, inasmuch as, though not very large in each separate mass, yet collectively they comprise a considerable area. I have seen several cases of this kind, and one I have especially under my care, in which a costal nodule forms a marked feature of the recurrence of the disease. Looking at the cases which were narrated by Mr. Stanley Boyd at the Ipswich meeting of the British Medical Association last year, I think this is one of the cases which certainly falls into the category of cases which may possibly be improved by the operation of oöphorectomy, and from that point of view I should urge the carrying out of that operation. At present we have much to learn about the curative results of this operation; it is purely, at present, in an experimental stage. I have performed three or four operations in which the removal of these organs has been done, but they have not been followed by the slightest improvement. If the ovaries in this case are removed I do not know whether it will be considered by Mr. Butlin as part of the treatment to give thyroidin—fifteen or sixteen grains in the day. Some surgeons lay considerable stress upon that procedure, and they say that operation of oöphorectomy alone is not sufficient to give any warrant for a good result afterwards. It is enforced that the patients must persist in taking this drug almost indefinitely, for if its administration is stopped the disease is likely to recur. At present I do not know much about it. Though collectively a large number of cases have been recorded, statistics show that the majority of them are unsuccessful. I do not think that more than eighteen or nineteen per cent. seem to be benefited in the slightest degree by the removal of the ovaries, even although combined with the administration of thyroidin. But I feel sure the operation will do her no harm, and I should strongly recommend it, although we have yet to learn what her mental condition will be in the future.

Mr. HOWARD MARSH.—This is a case of recurrent malignant disease. I do not think you can do anything for her by a fresh operation for the removal of the recurrence. I feel quite clear about that. But, under the circumstances, I think it is a fair case in which to give her any possible gain by removal of the ovaries. I think it is an open question, but I should not be surprised to find that in the next fifteen years the idea disappeared. On the other hand, however, there are cases which do seem to show, as far as they go, that the operation has an effect, and I should not deny to her the chance of benefit under the

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circumstances. As to promising her any definite result from it I should be afraid to go as far as that, but I think one is quite justified in recommending the operation to her, because it sometimes does good. Statements have been made that in some cases the administration of thyroid extract has done good.

Mr. LANGTON.—I should like to mention that the case of which I have been speaking was that of a patient aged twenty-six, who had an operation performed for the removal of the breast, but had a rapid recurrence. Oöphorectomy was performed six weeks ago, which has been followed by the almost complete disappearance of the small cutaneous nodules of cancer, but the growth of the mass above and below the clavicle is advancing.

Mr. BOWLBY.—I think this is a case of recurrent cancer which it is quite impossible to remove. The operation of ovariectomy for the condition is in the experimental stage at present. I am glad you have raised the question here, because I think it is one which is proper to raise in this case. My own opinion is that there is nothing proved as to the probability of cure in any case; but a certain number of cases have benefited by the operation. If the case were mine I should be prepared to do what I have done in other cases,—put the facts before the patient, telling her that an operation can be done which may be successful in staying the recurrence, and that if she agrees I am prepared to do it. As to thyroid extract, I have administered it myself, but, I am sorry to say, without any benefit. Still, there would be no objection to trying that also.

Mr. LOCKWOOD.—I think, with you, that nothing can be done for this patient except removal of the ovaries. I should estimate that if the case is left alone she cannot have more than eighteen months to live, and her death will be a most miserable one. I therefore think it is worth her while to take any chance of relief which may be offered her. After reading the published cases over, and thinking about them, and inquiring into them, I have come to the conclusion that ovariectomy is well worth trying, and that it is a fair and reasonable thing to do. I hope to see it done in her case.

Mr. D'ARCY POWER.—I think with my colleagues that it is quite justifiable. Two years ago we had a case in which Dr. Griffith removed the ovaries, and I removed one breast. At the time of the operation we thought she could not live a fortnight, but the patient was temporarily benefited by it for two or three months; but she got a recurrence, and died in six or eight months.

Mr. BUTLIN.—You see how not only conservative, but how excessively cautious we are in adopting any new treatment for the cure of cancer. We carry our prudence to a very great extreme, and we are quite right to do so. But in this case it seems to me it is a proper thing to try this treatment, because the case in itself is a very good one for it; it corresponds very well to the conditions laid down as being suitable for ovariectomy. With regard to the treatment by thyroid as well, I do not know whether I should do so or not. I should like to see what this operation will do without thyroid. I have tried thyroid alone in a good many cases now, but I have not seen one patient who appeared to be even temporarily improved by the administration of thyroid, even in very large doses. We have not yet found the cure for cancer, and I do not know whether we shall.

Mr. HOWARD MARSH.—Here is a man æt. 59, who has, I think you will agree, epithelioma of the foot over the metatarso-phalangeal joint of the great toe and adjacent parts. It has advanced to a considerable degree, and the patient at first said it had been there over two years; but on cross-examining him it appears more likely that the duration is nine months. He has a large amount of glandular disease in his groin, and I want to ask my colleagues what would be the best method of treatment; that is to say, should anything be done, and if so, what? Assuming that the diagnosis is agreed to, I want to raise the question whether removal by Syme's method will be advisable, and whether anything should be done to the glands in Scarpa's triangle. Careful examination of the abdomen does not reveal any enlargement of the lumbar glands. The glands in the groin are not very large, but they are very hard.

Mr. LANGTON.—I think it is simply a case of epithelioma of the foot, with infiltrated glands in Scarpa's triangle. I should do a Syme's in the lower third, and remove those glands.

Mr. BUTLIN.—I should do a Syme's amputation, and make a very complete dissection of all the contents of Scarpa's triangle.

Mr. LOCKWOOD.—I should do a Syme's am-

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putation, and the glands above ought to be removed.

Mr. D'Arcy Power.—I should do a Syme's operation, and remove all the infected glands you can find.

Massage of the Eyeball.—Casey A. Wood, in the 'Journal of the American Medical Association' of November 17th, 1900, says that massage is one of the latest remedies in ophthalmic surgery. It may be carried out by an indirect method, using pieces of cotton wool mounted upon sounds, with or without buttonheads or other devices. Indirect massage with the bulb of the finger placed on the skin of the lids is to be preferred. In some cases direct massage of the eyeball may be employed, but in most instances the indirect method by stroking movements with slight pressure on the exterior of the eyelids is quite sufficient and less difficult to carry out. Indirect massage should never produce pain, and rarely more than a passing discomfort. If the massage is employed in the treatment of the lids, the patient should be told to look down in treating the upper lid, and up in treating the lower lid. If the cornea is to be treated, the patient should look directly forward. The duration of each treatment should rarely exceed three or four minutes, and the movements should be circular, centrifugal, and centripetal. To-and-fro pressure is required to meet the conjunctival areas about the inner and outer canthi. The treatments should be at intervals of from one to three days. In beginning the massage, he instils a drop or two of cod-liver or castor oil, which is thoroughly distributed through the conjunctival sac. Mercurials can be added to the oil, and can often be used in quite large doses if they are prepared with care. An ointment of the nitrate of mercury, made with the brown cod-liver oil instead of lard, allowed to stand for a week or ten days, and then diluted with from 25 to 50 per cent. of cod-liver oil, is useful. It is dropped from the end of a glass rod into the lower sac. If the massage movements are begun at once the smarting is very slight. Such a method of treatment is useful in chronic infections of the conjunctivæ, in ulcers of and deposits upon the cornea, for the temporary relief of glaucoma, and for some forms of retinal embolism. Generally speaking, massage is contra-indicated in acute processes.—*Medicine*, January, 1901.

Paraphimosis.—Dr. Ray says in those cases of simple, non-inflammatory paraphimosis which occur in young boys, and which are so alarming both to the boy and to the parent when it is first discovered, the boy comes to you with a glans near an inch on a penis not over a quarter of an inch in diameter, while the prepuce is so tightly constricted behind the glans, that it looks like a physical impossibility to pass the glans back through such a constriction without doing some cutting. In one case a doctor had manipulated a little boy's penis in his efforts to reduce the paraphimosis, and at last the boy became so frantic from the pain of this long and fruitless attempt, that he rebelled against any further effort. The doctor then sent for me to give chloroform, so that he could go on with his work. I gave the anæsthetic, and he spent half an hour longer with negative results. He then allowed me to make an effort. In five minutes the case was relieved. In the other case the doctor spent about two hours, and at the end of that time he left the child with his father, and came after me to give an anæsthetic. The boy was so exhausted that he at once fell asleep, and we found him in that condition. I took hold of the penis, and proceeded gently and painlessly to attempt reduction. In less than a minute the head slipped through. What is the trouble in these cases? The swelling in these cases is not inflammatory, but wholly œdematous. And here lies the secret of the whole matter. By girding the penis with the thumb and index finger of the left hand, and then with the thumb and two adjacent fingers of right hand making gentle, steady, and uninterrupted pressure on the glans, the œdematous fluid rapidly oozes out through the constricting band, and in a very few minutes the glans penis is as flabby as a rag, and small enough to pass easily through the constriction. Any other kind of manipulation will accomplish nothing. Pushing and twisting, and even great force are worthless. Steady and interrupted pressure is the essential to success.—*American Practitioner*, December.

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A CLINICAL LECTURE

ON

PUERPERAL INFECTION.

Delivered in the Post-Graduate Course at Charing Cross Hospital,

By T. W. EDEN, M.D., M.R.C.P.,

Assistant Obstetric Physician to the Hospital.

GENTLEMEN,—I have the opportunity this afternoon of asking your attention to three cases of puerperal infection, which have been under observation recently in the wards of this hospital under the charge of my colleague, Dr. Routh, who has very kindly allowed me to make use of them for this purpose.

I propose in the first place to give you a brief *résumé* of the clinical course of these cases; and after that to take up one or two points of interest with regard to the subject of puerperal infection generally. This subject is so extensive, that it is impossible to undertake anything like an exhaustive study of it in the time at our disposal. I thought that it would therefore be better to select one or two points of interest for detailed consideration, than to attempt to go over the whole ground.

The history of the first case is as follows:—

CASE I.—The patient was a multipara aged twenty-five, who had previously had five children. Her last pregnancy was a twin pregnancy, and she was confined in October, 1899. She had been attended in her previous labours by the students in the maternity department of this hospital, and her name was down for attendance again. Her labour came on prematurely on the 27th September, 1900. It was fairly rapid, and by the time the student got to the case he found one child had been born, and that the patient was losing an alarming amount of blood. The uterus seemed big, and he sent for the resident obstetric officer, who found the patient almost pulseless from loss of blood, and recognised a second child lying transversely with the arm prolapsed; so he pushed up

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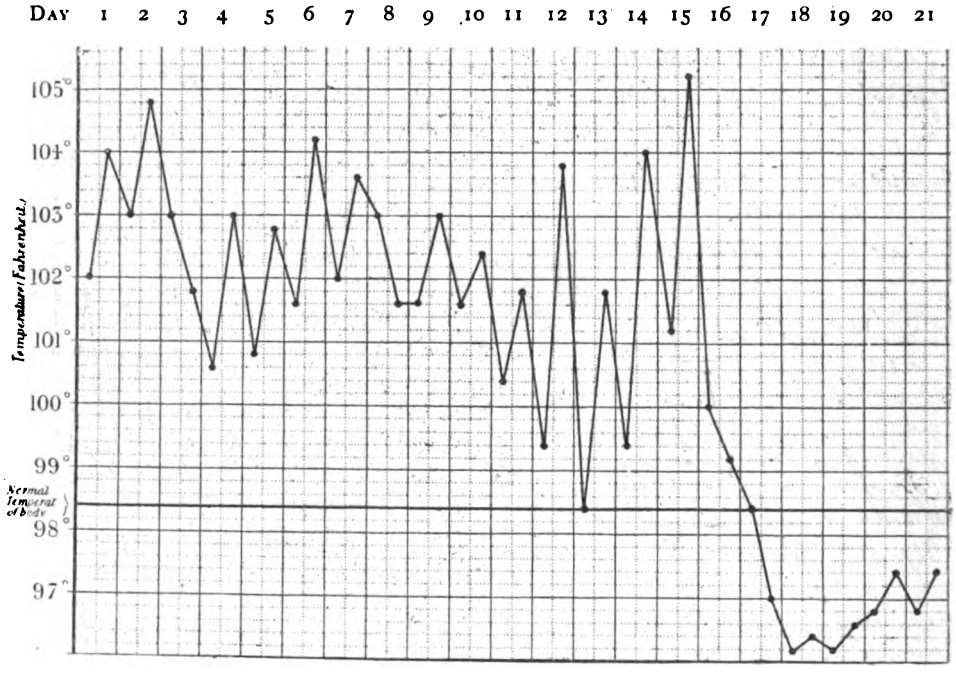
the body, and delivered the head with forceps. After it had been delivered, the placenta would not come away, and he was therefore obliged to introduce his hand a second time into the uterus to extract it. After that the hæmorrhage ceased, and the patient appeared to be fairly well. When the student made his visit on the following day, within twenty-four hours after the patient had been confined, he found her temperature 102° F. At the same time the lochial discharge, instead of being composed, as it usually is at first, of pure sweet blood, was bloody, purulent, and very offensive. The resident obstetric officer saw the patient also later in the day, and found her temperature had risen to 104° F. On the following day the temperature was 104·8°, and the discharges continued to be very offensive. The resident obstetric officer, therefore, explored the cavity of the uterus and, finding it was empty, he douched it with a solution of iodine. At the same time he administered a dose of 10 c.c. of antistreptococcic serum. The result of these two measures was to bring about some improvement. The temperature came down, and for the next three or four days the highest point was 103°; but the lochial discharge continued to be profuse and offensive. After two or three days it was arranged that a senior student should visit the patient twice a day, and administer an intra-uterine douche. This was done with various antiseptic solutions, but practically without benefit. Towards the end of this period of nine or ten days—from the fourth to the fifteenth day of the puerperium—the temperature shot up to over 105°. The patient then seemed so ill that she was admitted into the hospital. Here the douching was continued and her temperature dropped almost immediately, at any rate, very rapidly, to a subnormal point; within forty-eight hours after admission the temperature had become subnormal (see Chart I). At the same time the lochia became inoffensive, and diminished greatly in amount. We see, therefore, that for fifteen or sixteen days the patient had an offensive lochial discharge and a high temperature. But the temperature fell, and the lochial discharge became sweet at the same time, which time corresponded to the period of her admission to hospital. This I regard as a coincidence, the



Case I.—Puerperal Sapræmia. The Chart represents the first three weeks of the illness.

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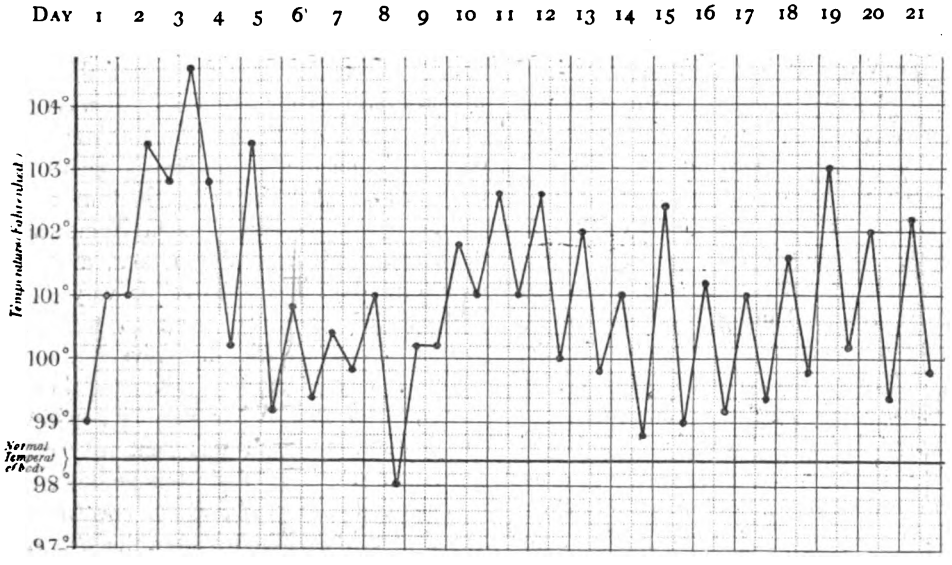
improvement in her condition being due to the fact that the disinfection of the uterine cavity had been at length accomplished, although, with the methods employed, it took fourteen or fifteen days. The temperature now continued subnormal for many days, and then it rose to 99°, and the patient was sick. On the day following the rise to 99° she had a severe rigor lasting two and a half hours, and the temperature reached the highest point it had yet attained. That rigor passed off in the course of the day, and the temperature dropped very rapidly again to normal and subnormal. After this rigor the temperature remained subnormal for several days, and then coma, and the temperature rose to 100·4°. The coma deepened, and the temperature fell and rose again. After being comatose for thirty-six hours the patient died without having regained consciousness. It is most unfortunate that we could not obtain a post-mortem examination. The urine contained neither albumen nor sugar. We will come back to the details of this case later on.

Case II.—You will see from Chart II that this case is of an entirely different kind. The patient was a multipara aged thirty-five. Her last full-time confinement was in 1898. Since then she has had three miscarriages. She was regular in



Case II.—Puerperal Septicæmia. The Chart represents the first three weeks of the illness.

gradually rose to a little above the normal, that is to say, about 99°; so that for several days immediately succeeding the rigor the patient had no pyrexia at all. Three or four days after the rigor it was noticed that a change was coming over her mental condition; she was inclined to weep very readily, and was subject to simple delusions. For a day or two she became very excited, and almost maniacal. The excitement passed off, and gave place to profound melancholia, which continued for several days, and then the patient became drowsy and somewhat stupid, and coincidentally with the stupor there was another rise of temperature. The stupor passed rapidly into the ordinary way on June 4th, 1900, and the period lasted from the 4th to the 7th. There was no period in July. On August 16th she had a severe hæmorrhage, which continued for twenty-four hours, and, if her story is to be taken as accurate, she lost a very large amount of blood. She stayed in bed for two days, and then, the bleeding having ceased, she got up. All went well until September 11th, which was thirteen weeks from the cessation of the monthly periods. She then had a return of the hæmorrhage, and a small fœtus was passed. Like so many poor women, she regarded a miscarriage as a trifling affair. She did not remain in bed, but got up and went about her ordinary duties.

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The bleeding continued and increased, so that on September 13th she was obliged to send for medical assistance. The doctor who attended her states that when he visited her he could not find any evidence of there being anything retained in the uterine cavity, although she was bleeding profusely. He continued in attendance, however, and two or three days afterwards he noted that her temperature was high, and that her pulse was very quick. On making a vaginal examination he found what he thought was a piece of placenta protruding through the external os; so he thought it was wise to send the patient to the hospital. Accordingly she came in. At that time her temperature was a little over 101°. The patient was obviously very ill at that time, and on the following day the resident obstetric officer explored the uterus under an anæsthetic. He was unable to find any retained portion of placenta or membrane, so he curetted the uterus, and afterwards swabbed the cavity with pure carbolic acid. On the following day the patient's condition was very much worse. The temperature rose from 101° to nearly 104°, and within forty-eight hours after the exploration of the uterus and the curetting the temperature had risen to nearly 105°. During this time there was practically no hæmorrhage; the lochial discharge was scanty, and was entirely inoffensive. I want to emphasise this particular point, that the lochia were inoffensive, so far as we know, throughout the course of the case. An intra-uterine douche was given on the third day following the operation, with temporary abatement of the temperature to 100°. After that her condition became worse; as you see the temperature gradually rose each day until it reached 102° to 103°. In this case there has been a long period of pyrexia, the whole illness having lasted nine weeks. The general aspect of the chart will strike you as being very like the charts of enteric fever. There has been a regular evening rise of temperature and a morning fall, and the difference between the morning and the evening temperatures has varied from one degree to five degrees. Occasionally the morning temperature has come down to the normal, and sometimes it has been below it. The evening temperature has always been very much raised. The usual general treatment has been adopted in this case; and, in addition, repeated use has been made of the antistreptococcic serum, but apparently without the smallest benefit. On the twenty-eighth day of her illness it was noted that there was a good deal of local pelvic inflammation. The uterus was found retroverted and fixed, with a considerable inflammatory deposit in the right fornix. And now, during the last week, her temperature has been gradually falling. It has taken six days to fall from 103° to the normal line, and the fever seems to be resolving itself by a process of lysis.

Case III.—The third case is represented in Chart III. The history of this case is very different from that of the others I have spoken of. This patient also was a multipara, her age twenty-two, and she had had three children previously. She had a normal confinement on September 2nd, 1900, and she made a perfectly good convalescence with this exception, that the hæmorrhage from the uterus continued for six weeks. It was never very profuse, but the patient had a continual discharge of blood from the uterus for six weeks after her baby was born. That brings us down to October 19th. About ten days after the hæmorrhage from the uterus had ceased the patient, after taking a walk one day, returned feeling very ill, in consequence of which she went to bed, and then had a severe attack of shivering. On the following day (October 30th) she sent for her doctor, who found her very ill, with a high temperature, and she was sent to the hospital immediately. The first temperature taken in the hospital was 101°, which corresponds to a period of thirty-six hours after the occurrence of the rigor. It was obvious that she was suffering from peritonitis, for she lay in bed with both legs drawn up; she had a considerable amount of abdominal distension, and she wore the anxious, expression which the cases of peritonitis generally present. The inflammation was not general, but local; it was practically confined to the pelvic peritoneum. On local examination the uterus was found to be fixed, and there was a swelling, not of a large size, in the right fornix in the position of the right tube. A good deal of matting of the bowel appears to have occurred about the level of the brim of the pelvis, accounting for some of the supra-pubic distension. No active treatment was adopted in this case. She was kept in bed, and the ordinary dietetic and general treatment of cases of this kind was adopted. No local treat-

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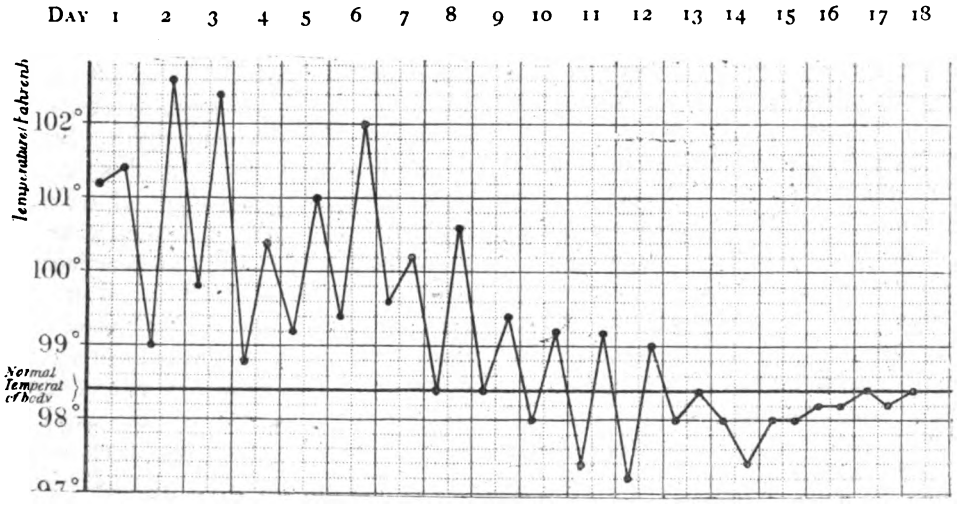
ment was employed, no antitoxin was administered, and the patient made a steady recovery. Her temperature, after having reached 102° for two or three days, began to fall, and it has continued to fall gradually, until at the present time she has had four or five days without any fever at all. The whole illness did not last for more than a fortnight. It was a case of pelvic peritonitis.

Such were the general histories of these three cases, and it will be obvious to you that they present many points of difference from one another. In the remainder of the time at my disposal, I propose to go more fully into the following three points: first of all the circumstances under which the infection occurred in these three cases, what we may call *the incidence of the disease;* and secondly, the *nature of the infection;* and thirdly, to discuss some points from the general course of these cases with *especial reference to prognosis.* Nothing is so difficult in this sort of case as to decide what is likely to happen to the patient, and these cases throw some light on what is always a difficult question.

First, then, with regard to the *incidence of the disease.* In the first case the general conditions were as unfavorable to the patient as they could be. Here we had to deal with a twin pregnancy, and from our student lore we remember that a large placental site favours infection. There is a large area for absorption in these circumstances, and if there are any pathogenic germs in the genital canal they stand a better chance of entering the circulation. Here, also, there was separation of the placenta during labour. I told you that after the first child was born there was so much hæmorrhage that the resident obstetric officer was alarmed by the patient's condition when he reached the house. This hæmorrhage could only have been due to partial separation of the placenta on the expulsion of the first child. In this case further, it was necessary for the accoucheur twice to introduce his hand into the uterus, first in replacing the arm of the child and bringing down the head, and again after delivery of the fœtus, in removing the adherent placenta. Labour being premature is always an additional difficulty in the homes of the poor. It is impossible in an emergency to get clean linen either for the bed or for the patient, and no matter how careful the attendant may be it is impossible for him to maintain practical asepsis under conditions like these. Therefore the chances of an aseptic puerperium were in this case as bad as they could very well be. These conditions are not exciting causes of puerperal infection, but they are very important predisposing causes, and they render the task of the accoucheur in maintaining practical asepsis very difficult indeed.



Case III.—Late Gonorrhœal Perimetritis.

The circumstances in the second case were quite different. She had a threatening of abortion in

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August, and an incomplete abortion a month later. As far as we know, until the third day after the passage of the fœtus no local examination whatever had been made. As far as we know—our information about this period is not very exact—no interference, beyond vaginal examination, was employed until the resident obstetric officer explored the uterus in this hospital. The principal feature, as a matter of fact, seems to have been neglect. The patient had a loss of blood which she neglected, she went about her business and that loss of blood recurred; and then probably incomplete abortion occurred, perhaps the fœtus was expelled without the chorion or amnion. Later on the abortion was completed, for the uterus was found empty when explored in the hospital. Probably she paid no attention to herself in the matter of personal cleanliness and the possibilities of infection, and in such circumstances infection is likely to occur even in the absence of interference.

The circumstances of the case in the third instance were entirely different. Perhaps you may question my right to call this third case one of puerperal infection, because the symptoms did not arise until seven weeks and two days after the child had been born, and the patient had had a normal confinement, and had continued well enough to go about during the whole of the intervening period. But let me once more call your attention to this important fact, that during six weeks from her confinement she had a discharge of blood from the uterine cavity, and therefore her puerperium was not normal. The infection here is obviously a very different kind of infection from that of the two preceding cases.

That leads us to the second point, namely, the *nature of the infection*. With regard to these first two cases, of course, there can be no doubt that both of these are cases of septic poisoning or infection. With regard to the first case there is no escape from the conclusion that the infection occurred during labour. It will be understood at once that I am attaching no blame to anybody in this case. I have pointed out how excessively unfavourable the circumstances of the patient were, and how impossible it was in the emergency, as it arose, to maintain anything like asepsis. The moment at which the infection occurred in the second case I am unable to say. These two being cases of septic infection, it is obvious from the points of difference between them, which you have probably picked up as I have proceeded, that they belong to different kinds of septic infection. As a matter of fact, I think they are fairly good illustrations of the two main types of septic infection, viz. *septicæmia* and *sapræmia*.

Sapræmia is a local putrefactive process taking place in the uterine cavity, without any general infection of the blood or lymphatic vessels, or the general system of the patient. It is usually associated with retention of dead tissue in the uterine cavity; it may be a bit of placenta, or membrane, or blood-clot. These dead tissues form a suitable nidus for the development of putrefactive organisms. When this putrefaction occurs the lochia become offensive, and the general symptoms, such as fever, are due to the absorption into the blood of the poisonous products of the putrefactive process. These products bacteriologists call toxins. Septicæmia is a different condition. In that condition the poisonous organisms, instead of multiplying and growing in the uterine cavity, make their way through the placental site, or some laceration, into the blood or lymph-streams, and travel all over the body of the patient. Their place of growth is the general tissues of the body; they are present everywhere in the blood-stream, and in the tissues, and in the secretions. In septicæmia the whole body is invaded by these organisms, while very frequently the uterine cavity remains sweet. That is exactly the type we have in our second case. Here the uterine cavity was found to be empty; the lochial discharge throughout the case was scanty, and had never at any time been offensive. Therefore there was no local putrefactive process going on in the uterus. The first case was different; within twenty-four hours after the labour the patient had a profuse fœtid lochial discharge, and a high temperature, obviously a local putrefactive process going on in the uterus. There may have been a bit of placenta or membrane which escaped observation. But it is not necessary that there should have been such tissue, because in sapræmia you do not always get these dead tissues retained. The superficial tissues of the uterine wall probably always undergo necrosis, and are therefore liable to putrefaction. The putrefactive process in this case was a very

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tenacious one, because notwithstanding repeated administration of the intra-uterine antiseptic douche the lochial discharge remained offensive for many days—fourteen or fifteen days,—and when at length it was disinfected, and the offensive odour disappeared, the temperature came down immediately. I hold, therefore, that these two cases are instances of sapræmia and septicæmia respectively. The points of difference between these two cases will illustrate the points of difference between sapræmia and septicæmia.

First of all we will take the modes of onset. In the case of sapræmia the onset was extremely rapid. Within twenty-four hours of the confinement the patient was seriously ill, her temperature was raised, and the lochia were offensive. In the case of septicæmia the onset was much more gradual; so far as we know there was no rise of temperature at all until the fourth or fifth day after the miscarriage, and when her temperature rose it was not so high as in the case of sapræmia, and was not accompanied by the same amount of profound illness. In that respect these two cases are atypical of the two conditions, because the onset of septicæmia is usually more acute than that of sapræmia. You will easily understand that many cases occur in which it is impossible to draw this easy distinction between sapræmia and septicæmia; there is reason to believe that we often have to deal with a mixed infection, with cases in which, in addition to the putrefactive process in the uterus, there is also general poisoning of the tissues of the patient by organisms.

The second point of difference is in respect of the lochial discharge. And here our cases are typical. In the case of septicæmia it was scanty, and was never offensive, and very soon it ceased altogether. In the case of sapræmia it was abundant and offensive. If the case be one of mixed infection you may have septicæmia associated also with an offensive lochia. That is due to both processes being at work in the same patient.

The third point I would draw your attention to is the different effect in these two cases of local treatment of the uterine cavity. In the case of septicæmia the uterine cavity was disinfected when the patient's temperature was 101°. On the following day it rose to 103°, and within forty-eight hours to 104°. Therefore the disinfection of the uterine cavity appeared to do no good. In the case of sapræmia, when that disinfection occurred the temperature fell in forty-eight hours to a subnormal point. In septicæmia local treatment applied to the uterus in the way of disinfection is of no use. Sometimes it even does harm. In sapræmia, on the other hand, disinfection generally cures the patient within forty-eight hours. These two cases illustrate that point very well.

The fourth point is the mode of resolution of the fever. In the case of sapræmia the fever abated suddenly, coincidently with disinfection of the uterine cavity. In the case of septicæmia, which has run a much longer course, the fever came down by a gradual process of lysis.

The last point of distinction lies in the condition of the pelvic organs. In the case of sapræmia, although there was a foul discharge from the uterus for fourteen or fifteen days, the pelvic peritoneum and cellular tissue, and the tubes and ovaries, remained quite healthy; there was no pelvic inflammation whatever, another proof that the infective process was confined to the uterine cavity. Now in the case of septicæmia things are entirely different. By the twenty-eighth day there was evidence of considerable local pelvic inflammation; the uterus was fixed by adhesions, and there was a swelling in one of the fornices, probably salpingo-öophoritis with the usual inflammatory thickening of the peritoneum and cellular tissue. I do not suppose there was any formation of pus in this case, or we should not have got such a straightforward cure as we appear to be obtaining.

Those are the points of difference between these two cases, and on the whole they illustrate fairly well the differences between sapræmia and septicæmia.

Now we come to consider the nature of the infection in the third case. As I say, there may perhaps be in your minds some objection to my classing this as a case of puerperal infection. But I base my view on two points. In the first place, on questioning the patient I found that the child which was born had suffered from ophthalmia; within one or two days of birth it developed a discharge of matter from the eyes. It was taken to an ophthalmic hospital, and after treatment there for a fortnight it was cured. That is obviously a case of ophthalmia neonatorum, and it is pathognomonic of gonorrhœa; it only occurs in newly-born infants as a result of gonorrhœal

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infection; therefore in this fact we have the best proof that at the time of her confinement this woman was suffering from gonorrhœa. In the second place, you remember, this woman did not get entirely well after her confinement, but had a continual discharge of blood from the uterus for six weeks. During that time the gonorrhœal infection was probably spreading from the vagina into the uterine cavity, and from the uterine cavity it probably spread, as gonorrhœa does, to the mucous membrane of the tubes, or perhaps to the ovaries, and then—seven weeks had elapsed since the confinement—it culminated in a sharp but brief attack of pelvic peritonitis. This is characteristic of the course of gonorrhœa in women. I do not know any other explanation of all the facts of this case, as I have laid them before you. You may say it is possible for a woman with gonorrhœa to have pelvic peritonitis like this whether she be confined or not; therefore why do you call this puerperal infection? That is perfectly true; but it is well recognised that the spread of gonorrhœa to the peritoneum is rendered very much easier by abortion and by labour, because the physical conditions which follow labour are very favourable for the spread of the gonorrhœal virus to the peritoneum. The cervix is dilated; you have the large bare area of the uterine cavity, you have the lochial discharge streaming down in the vagina for a week or ten days; this is an alkaline fluid containing large quantities of albumin, and it forms an excellent medium for the growth of organisms like the gonococcus. Therefore during the puerperium the conditions are as favourable as they can be for the spread of gonorrhœa. I think the uterus became infected during the week or ten days following confinement, and the gonococcus gradually advanced into the tubes, and finally resulted in this attack of pelvic peritonitis.

We have now a minute or two left in which to refer to the *question of prognosis* in these three cases. The prognosis in an uncomplicated case of sapræmia, is favourable. If you can cut short the putrefactive process in the uterine cavity you cure your patient with great speed and certainty. I never saw a case before in which there was so much difficulty in disinfecting the uterine cavity as there was in Case 1. The obvious moral may be drawn, that it is very difficult by means of douching to disinfect the uterus at all. It is always better in these cases to thoroughly disinfect the uterine cavity under an anæsthetic; but I am myself to blame that this was not done in the present case. Once the temperature had come down, it proceeded on the lines one expects. The reaction from pyrexia generally leads to a subnormal temperature for a little while. I find it difficult to come to any conclusion as to the significance of the rigor which occurred later on. It is impossible to conceive it to be a septic rigor, because it was not followed by fever. I think it must have been due to some accidental cause, the nature of which, however, I cannot explain. The illness culminated in puerperal insanity, which ended in death. There is no very definite relation between puerperal sepsis and puerperal insanity; insanity is more likely to occur in complicated cases, in women who have suffered from convulsions or sepsis, or who are very anæmic. But it is very seldom indeed that puerperal insanity terminates in the tragic manner in which this case terminated. When I saw her yesterday she was profoundly comatose, and I thought it possible that there was cerebral hæmorrhage. But there were no localising symptoms, nor anything definite to go upon beyond the coma and the rise of temperature. It must be a matter of disappointment that we have been unable to clear up the significance of this case.

On the whole the prognosis of sapræmia—apart from such accidental complications as the occurrence of puerperal insanity, which you cannot foretell or prevent—is good. The prognosis in septicæmia must always be guarded. You never know what is going to happen. The case may start in the ordinary way, and appear to be a mild attack, and then suddenly become much more serious. The course of the case is often prolonged, and the result depends on the virulence of the infection, and on the vital powers of the patient. If you can keep the patient alive until the organisms have lost their virulence the patient will get over it; but if her strength fails while the organisms are still at work she will die.

The third case, of gonorrhœal peritonitis, illustrates the general rule that the later the infection occurs in the puerperium the more simple the case, and the more easily does the patient get well, and this other point also, that gonorrhœal

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puerperal infection is seldom as virulent as septic puerperal infection.

There now remains the question of remote prognosis in the cases which recover. Are these women permanently damaged, or do they become as healthy as they were before the attack? That depends to a great extent on the question of local inflammatory lesions. A woman may pass through a very severe attack of general septicæmia, and if she has no local pelvic inflammation she will be just as well afterwards as a woman who recovers from an attack of typhoid fever. But if, in addition to the general septicæmia, she gets local pelvic inflammatory lesions the prognosis is not nearly so good, because damage is done to the pelvic organs at this time from which they very seldom entirely recover. Many of the cases of chronic pelvic inflammation, which are so common in the gynæcological out-patient rooms, have begun in illnesses which followed labour. They are cases of septic infection with local inflammatory lesions, and these lesions are very apt to persist, and make more or less chronic invalids of the women who are the subjects of them. Although in our case of septicæmia the disease has lasted so long, yet there is, up to the present time, no sign of resolution of the local pelvic inflammation. I examined the patient yesterday, and found that the uterus was practically immovable, and on the right side there is a large inflammatory deposit, which at the present time shows no sign of resolution. There is no pus there because the temperature has come down, and the likelihood is that if we are able to keep this patient at rest for two or three weeks still to come, a good deal of this inflammatory effusion will be absorbed. But it is practically certain that permanent damage has been done to the tubes and ovaries. Probably the tubes are sealed up, and are therefore useless for their proper functional purpose of bringing the ova and the spermatozoa to one another. If both tubes are thus affected she will henceforth be sterile.

With regard to the case of gonorrhœal infection, one must be very guarded in prognosis, because one of the principal features of gonorrhœal peritonitis is its tendency to recur. It is probable that this patient, after she has recovered from this attack, will in a few months time get a second attack, which is likely to be more severe than this. It is a peculiarity of the activity of the gonococcus that it is subject to exacerbations. It lies quiet for a time, and then breaks out into renewed activity, resulting in another attack of pelvic peritonitis. I am afraid it is possible that this woman, now that her pelvic peritoneum has become infected with gonococcus, may get a succession of attacks, or she may even in time get a pyosalpinx, or an ovarian abscess. There is reason to believe that gonorrhœal infection in the peritoneum does not always go on to suppuration; she may escape simply with sealed tubes and damaged ovaries. But I am afraid the remote prognosis, as regards the fertility of the patient, in both the second and third cases is bad.

"Imperative Surgery."—Confronted by a grave emergency, where the life of a human being seems to hang upon the possibility of relief through surgical skill, the conscientious physician, when he feels that he is not sufficiently versed in the art and method of operating, will seek the assistance of an expert. Should time and place conspire, however, to make the presence of a surgeon impossible, the entire responsibility devolves upon the one who may chance to find himself in charge; and unless he is willing to assume the risks of hesitation, he must act the part of the surgeon and perform, to the best of his knowledge and ability, the work before him."

The above paragraph is the opening passage of Chapter I of a book called 'Imperative Surgery,' published by the Macmillan Company. The author of this useful and practical work, Dr. Howard Lilienthal, need not mind the somewhat cheap criticism with which some reviewers have greeted his volume; his recompense must be the gratitude of the men for whom the book is intended, the medical men who, far from professional assistance, must depend solely on their own resources and unaided efforts in doing their plain duty. To the many practitioners who have to work alone this book will be invaluable. All the operations which emergency may compel a medical man to undertake are fully explained, nothing is taken for granted, no detail is taken as known, and every step is not only clearly explained, but is also admirably illustrated. "A friend in need is a friend indeed," and such this book will prove to the large body of practitioners who at any moment may have to undertake and carry through some important surgical operation of which they may have but little, if any, practical acquaintance.

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THE DIAGNOSIS AND SURGICAL TREATMENT OF TUBERCULAR PERITONITIS.

By F. C. WALLIS, B.A., M.B., F.R.C.S.,
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TUBERCULAR peritonitis, owing to its fitful and insidious onset, is often not recognised until the disease is well advanced, and even then attention may be drawn more to what may be called some vagary of the disease than to the condition producing it.

The two main symptoms are swelling of the abdomen and gradual wasting of the frame. Associated with these are a certain amount of fever, attended by digestive disturbances, constipation alternating with diarrhœa, and occasionally vomiting and abdominal pain. The degree of fever varies greatly in each case, and does not run any particular course. As the abdomen becomes distended, there may be every variety and combination of tympanites and dulness. This depends upon the amount of matting of the intestines that may occur—the thickening of the omentum—and the situation and variety of the adhesions. Under these conditions tubercular peritonitis simulates many other abdominal diseases. Ovarian cysts, uterine fibroids, sarcoma of the kidney, typhoid fever, appendicitis, and hydatid disease are a few of the misleading mimicries to which at times tubercular peritonitis lends itself.

A vast amount has been written upon this subject, but in looking through text-books and those manuals on surgery which are mostly consulted, I find nothing but the barest reference to the disease. I purpose in this paper to try and put in a practical form what may be said as to the diagnosis, and particularly, as to the surgical treatment of the disease itself, and whatever complications it may give rise to.

The classification of the disease which is most used is that of Aldibert, which is given under three headings, viz. (1) the ascitic; (2) the fibrous; (3) the ulcerous form.

The ascitic form, as its name implies, is characterised by the presence of ascitic fluid in more or less abundance.

It may be acute, subacute, or chronic, and this last form may have become encysted by the formation of peritoneal adhesions.

The fibrous form is a later stage of the ascitic form, which is recovering. Here the fluid has become absorbed in great measure, and these cases just before the absorption of the fluid and before the formation of adhesions exhibit large tubercles all over the serous membrane, the size of the tubercle distinguishing it from acute miliary tuberculosis (Treves, Lettsomian Lecture).

Later on adhesions form, and every variety of matting of the intestine occurs. It is this form mainly which simulates various other abdominal disorders.

The ulcerous form is characterised by the caseation and breaking down of the tubercular deposits—there may be various encysted collections of fluid which are clear, blood-stained, or purulent. Tubercular abscesses may form, and when opened there may be found a direct communication with the intestine, and a fæcal fistula is the result. Two coils of intestine may become adherent and open into each other, or a fistulous opening may occur after an abscess has formed and been opened.

The diagnosis of tubercular peritonitis, which formerly was a matter entirely medical, can no longer be regarded as such, inasmuch as a surgeon is asked in so many cases to operate if he thinks the case a fit one. The old idea that a surgeon was called in by the physician to carry out the wishes of the latter in a completely mechanical manner, offering no opinion and taking no responsibility, is, happily, rapidly becoming a thing of the past. The sooner this becomes absolutely a matter of history, the better for the physician, the surgeon, and above all the patient.

The early symptoms of tubercular peritonitis may be so vague and so slight that no attention is paid to them, or if they come under the notice of the medical practitioner they are probably treated somewhat perfunctorily as digestive troubles. In such cases, if it is found that, in spite of the treatment as mentioned above, the digestive troubles persist—there are vague abdominal pains and tenderness on manipulation, then the case should be carefully watched; the *temperature* should be taken night and morning, the girth of the abdomen observed from time to time, and attention should be given to the condition of the patient

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as regards general wasting. It must be borne in mind that the two main symptoms, as already mentioned, of this disease are abdominal swelling and general wasting, associated with fever. In all cases where tubercular peritonitis is suspected, careful inspection should be made with a view to discover if tubercular disease exists elsewhere. This is more commonly the case than not, and when discovered it will go a great way to confirming the diagnosis.

Treves, in his Lettsomian Lectures on Peritonitis, quotes a table of Aldibert's of 308 cases treated by laparotomy, and of these *13 per cent.* had primary tubercle in the *genital organs*.

The ascitic form is recognised by the following symptoms, viz. fever, intestinal disturbances, general wasting, abdominal swelling, with presence of ascites and occasional vomiting. In small children all these symptoms may be regarded as rickety signs, especially if other indications of rickets are present; but if the abdomen is examined and percussed for free ascitic fluid, and this be present, no doubt can possibly exist as to the nature of the disorder.

Ulcerative colitis in children is sometimes accompanied with abdominal distension, and a diagnosis has to be made between this and tubercular peritonitis. The abdominal distension in this case would be due to distended intestine; moreover the character of the stools would help in the diagnosis of the ulcerative colitis, and in some cases this symptom is the main one by which differentiation is arrived at.

Ovarian cystic disease is often simulated by this ascitic form of tubercular peritonitis; so often, indeed, that, according to Osler, in ninety-six cases of abdominal section for tubercular peritonitis, *thirty* were diagnosed as ovarian previous to the operation.

Norris ('Amer. Journ. of Obstetrics,' vol. xxxiv) gives instances of three cases under his care, in which, although tubercular peritonitis was under consideration, yet it was thought in each case that an ovarian or parovarian cyst was the matter. Norris insists on thorough vaginal investigation in doubtful cases, to see whether the tubes and ovaries can be made out, and also pays great attention to the general condition, family history, and to the past health of the patient.

The diagnosis between *ordinary ascites* and that due to tubercular peritonitis is generally established by the fact that, as a rule, in ordinary ascites the intestines float up to the surface, and the abdomen is resonant in front and dull in the flanks. In tubercular peritonitis the abdomen is dull all over on percussion. In ovarian disease the abdomen is dull in front and resonant in the flanks.

The *fibrous* form, as already stated, is the one which, above all others, is liable to lead to mistaken diagnosis; and, what is of more importance, it is in this variety that intestinal obstruction is likely to occur.

Here the onset is insidious in character, commencing often with a small amount of ascites, which gradually disappears. The symptoms are almost negative, and probably the first thing that attracts attention is some acute intestinal trouble, or the discovery of an abdominal tumour, with or without symptoms. In women, when the intestines become matted around the uterus, palpation will give the suggestion of a large fibroid. Again, if the intestines are matted over one or other kidney, the resemblance to an enlarged kidney is marked. Various other abdominal tumours may be simulated by these adherent coils of intestine; and, as is often the way, the tumour once discovered, various symptoms rapidly arise which fall in with the diagnosis.

The *ulcerous form* is often a further stage of the fibrous, and is characterised by the caseation and breaking down of the tubercular products. The symptoms are marked wasting, hectic temperature, vomiting, and diarrhœa.

The abdomen is large, and exhibits all varieties of dulness and resonance, and on palpation various hard masses can usually be felt. This variety may resemble *appendicitis* when a hard and tender mass is felt over the region of the appendix. *Typhoid fever* may also be simulated in cases where the abdomen is not much distended, and the main symptoms are fever and diarrhœa. In the later stages the tubercular masses become adherent to the abdominal walls, which become thickened and inflamed, and eventually an abscess is the result.

It will thus be seen that, although the plain, straightforward cases present no difficulties in the way of diagnosis, there remains a large percentage in which the symptoms are so masked, altered, or added to, that diagnosis becomes most difficult,—in

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fact, almost impossible without opening the abdomen. If this is done the ascitic and ulcerous forms offer no further difficulties; but in the fibrous, where the matting of intestines occurs without any marked tubercular lesion showing itself, grave errors have been made, and the intestine has been wounded, and fatal damage done, before the state of things has been recognised. In such instances as this, when a mass presents itself, *percussion* of the lump should never be omitted. This will often strike the key-note of the situation.

The *treatment of tubercular peritonitis*—apart from medical treatment—resolves itself into a laparotomy in the first instance. Whether anything further is necessary will depend upon the form of tubercular peritonitis existing in the patient, and also to a great extent upon the views of the operator.

According to Treves, it has been estimated that in the *medical* treatment of the ascitic forms 9·5 per cent. are cured, 19 per cent. die, and 71·5 per cent. remain stationary. Whereas an analysis of reports of *surgical* cases shows—mortality below 3 per cent., marked improvement 80 per cent., permanent cure 30 per cent. (Parker Symes). Statistics are not worth a great deal, but the differences here are so startling as to be worth recording.

One method of treatment which should be scouted from the first is tapping, either with an ordinary trocar or with an aspirator. It is a proceeding full of danger, and the result is *nil* as far as curing the patient is concerned. Abbé relates an interesting case ('Annals of Surgery,' 1897) of a woman from whom on two occasions a quantity of fluid was removed by tapping, with no curative result. Finally, laparotomy was done under eucaine, and a perfect recovery ensued.

In the *ascitic* form five methods of laparotomy have been adopted:

1. Simple incision, with free evacuation of the fluid and closure of abdominal wound.
2. Incision, with subsequent flushing of the abdominal cavity with sterile water, saline solution, or some mild antiseptic solution, and closure of the wound.
3. Incision, flushing, and thoroughly drying the abdominal cavity, closing the wound.
4. Incision and drainage.
5. Incision, drying the peritoneum, and treating it with some drug, as iodoform, camphorated naphthol, etc., closing the wound.

Perhaps the last method is more usually undertaken in cases of the ulcerative form; but, as it has been used in various cases of the ascitic form, it is mentioned here.

Any decision as to the relative worth of these various methods is a little difficult to arrive at, as each method appears to have strong advocates.

Treves states that in cases of generalised peritonitis the best results have followed simple incision without flushing,—cases not irrigated showing 74·3 per cent. of cures, those treated by irrigation being nearly 2 per cent. less. This is a small difference, which may be almost neglected, but on general surgical principles the decision here would of course be in favour of the simpler measure.

Alexis Thompson ('Practitioner,' 1895) records cases where, when tubercle has been present in a patent funicular processus vaginalis, as well as in the abdomen, the removal of the processus, or merely incising it, has been followed by cure. Another case was that of a young woman who had suffered four distinct attacks of pain and swelling in the right iliac fossa, which were mistaken for appendicitis; the abdomen was opened, and the case proved to be tubercular peritonitis; the abdomen was closed, and a complete recovery resulted.

Schramm ('Archiv für Gynäkologie, vol. v, 1898) strongly advocates Baum's treatment, who washes out and thoroughly dries the abdomen. This was done in the case detailed by Schramm, who watched the case for eight years after. He emphasises the desirability of watching the cases for some time after the operation to see that no return takes place.

The efficacy of simple incision is well shown in a case recorded by Abbé of a woman who for marked tubercular peritonitis was operated on by simple incision, and made a complete recovery. Two and a half years after she was operated on for a small ventral hernia; during this process the abdomen was inspected, and no trace of tubercle was discovered.

F. Merkel ('Zeitschrift für Geburtshülfe und Gynäkologie') gives a remarkable instance, showing the curative effect of laparotomy in cases other than tubercular peritonitis. This was a case of sarcoma in which abdominal section was per-

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formed, and nothing further was attempted. The patient was alive and well three years after the operation.

Draining the abdomen does not seem to be much in favour. It is not necessary, and seldom efficient. Tubercular infection of the wound may occur. The chances of sepsis are much increased, especially in children. A ventral hernia is a possible sequela, or a sinus may be left.

If for any reason a drain is used, let it be of gauze, and not an india-rubber tube, which is apt to damage the intestine, and cause a fæcal fistula.

It must be remembered that the foregoing remarks apply to treatment of the ascitic form of tubercular peritonitis.

As an instance of the effects of medication of the peritoneum, the following case of Abbé's is worth recording:

Abdominal section was performed in a practically moribund child. The cavity of the peritoneum was lined everywhere with tubercle, and in the lower part of the abdomen were tubercular fungating masses.

The abdomen was washed out with saline solution, and (after the method of Rendu) treated by freely applying a mixture of one part of camphor with two of naphthol over the peritoneum, and closing the abdomen.

Vigorous reaction set in next day, and the temperature rose to 106°, but this rapidly fell to normal, and the child made a perfect recovery. When the paper was read the patient was described as fat, rosy, and vigorous.

It will thus be seen, as has already been mentioned, that except in the matter of drainage these various methods have all something to be said in their favour. The one which most claims our attention is a laparotomy, with or without subsequent washing.

Statistics of hundreds of cases have been published, showing the great percentage of absolute recoveries after this simple proceeding. This in itself is very satisfactory, and would be completely so if we could state definitely what brings this result about.

As to this, the following theories have been put forward:

1. The removal of the ascitic fluid causes an alteration in the abdominal pressure, and an increased blood-supply.
2. Exposure to air.
3. Action of light.
4. Introduction of tox-albumin, which is fatal to the tubercle bacillus.
5. Traumatism of operation causes fibrinous peritonitis, and the bacilli become encapsuled.
6. It is due to the advent of leucocytes and the resulting phagocytosis.
7. The opening of the abdomen causes a physiological change, which in some way is detrimental to further growth of the bacilli.

This last is so delightfully vague that it renders criticism unnecessary. As to the part played by leucocytes and phagocytosis, the experiments carried out by Nannotti and Baciocchi show that it is reasonable to suppose that this process has much to do with the healing. In these experiments a number of rabbits and dogs had tubercular peritonitis induced, and they were then left alone. After a certain interval some were operated on, and the rest left. All those left alone died with one exception. Of those operated on all the rabbits died, but seven dogs recovered.

When the abdomens of these animals were looked at later, the changes observed consisted of granular disintegration of bacilli, phagocytosis by epithelioid cells, degeneration of cells constituting the tubercular tissue, penetration of the latter by new vessels, and connective tissue, leading to its absorption and replacement by scar tissue.

The authors point out that exactly the same process of recovery takes place when it is spontaneous, and that the benefit of the operative interference depends upon the technical handling of the tissues. It would appear, therefore, that ordinary massage may do good, but having regard to the few recoveries under this treatment, the manipulation would hardly seem to cause adequate reaction.

Alexis Thompson suggests that the mere opening of the abdomen gives the requisite stimulus to set up the necessary reaction to overcome the slow progress of tubercular peritonitis.

Bearing in mind the experiments quoted above, and the cases reported by Thompson and others, it seems reasonable to believe that this view is the correct one, and that the exposure to the air or the action of light has nothing to do with it.

Taking this as the reason of cure in these cases,

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viz. that the stimulus produced by simple incision is sufficient to kick the balance in favour of the patients, I cannot help thinking that washing out, sponging, and generally overhauling the contents of the abdomen, when properly conducted, can only act for good, by increasing the reactionary and resisting power of the peritoneum.

On the same principle abdominal medication will act even more strongly, but I do not advocate this except in special cases, such as the one quoted above. Here the benefit is twofold; the further progress of the disease is checked, and the formation of pus prevented.

In the ascitic variety, then, one may conclude that laparotomy, with or without manipulation, is of great benefit in a large percentage of cases, and that the danger is slight. Further, pulmonary tuberculosis, if not too far advanced, is rather an indication for the operation in that it brings about an improvement in the general conditions of the patients. The operation can quite well be done under a local anæsthetic if necessary.

Watson Cheyne states that it is not advisable to operate *too early* in these cases, as the results are by no means so good, and relapses more likely to occur. This statement, coming from such a source, should be borne in mind.

Operative interference in the fibrinous or ulcerative form, or in a combination of the two, is often a serious matter, and many degrees removed from the simple laparotomy discussed above.

Here, there is little or no fluid, and, as has already been said, some intestinal trouble, or the presence of a tumour is the reason for operation.

Great care is required in opening the abdomen in these cases, as the intestine is often adherent to the anterior wall, and in not a few cases the intestine has been opened and a fæcal fistula resulted, when worse has not occurred, and the patient died from fæcal extravasation into the general abdominal cavity.

The mimicry of the disease is quite extraordinary in this form of it, and a large percentage of cases have been published in which the abdomen has been opened on a wrong diagnosis, and some elaborate operation undertaken before matters could be put right.

The following interesting case of Maurice Patel ('Gazette hebdomadaire du Médecine et de Chirurgerie,' 1900) bears this out. A. G—, aged twenty, was admitted for supposed appendicitis, and was eventually operated on for intestinal obstruction. A large mass of tubercular mesentery was found between the cæcum and the vertical attachment of the mesentery; to this five to six feet of intestine were adherent. A lateral anastomosis was performed by joining the free bowel above to the large intestine beyond the mass.

Patel remarks that in many cases where the mesentery is involved, intestinal occlusion occurs, with or without the presence of a tumour. There are three varieties of this kind for which an operation may be necessary:

1. The complete agglutination of the intestine. For this the remedy would be an artificial anus.
2. Where in spite of mesenteric and intestinal lesions the intestine is moveable or only slightly adherent. These cases can be treated by resection, and as many as five feet have been resected.
3. The case quoted above is an instance of this class, in which the intestines are matted together in part, but freely moveable bowel exists above and below the coherent mass. In such cases lateral anastomosis offers the best chance, as it not only overcomes the obstruction, but also allows the cut-off intestine to drain to a certain extent.

Such cases, then, form a class, which call for surgical aid, either on account of a tumour, or because of intestinal obstruction, and according to the case the treatment is either—

1. The formation of a fæcal fistula;
2. Resection of the bowel; or
3. Lateral anastomosis or short circuit.

Four varieties of abdominal tumours which are caused by tubercular inflammation have been described:

(*a*) Nodular tumours of the mesentery.
(*b*) Tumours of the omentum.
(*c*) Thickened, contracted, and adherent coils of intestine.
(*d*) Encysted exudation forming a tumour, with walls composed of adherent intestines, and other abdominal or pelvic viscera, which happen to be adjacent to the focus of inflammation.

With regard to the first two, they present no

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difficulty of recognition when once the abdomen is opened, and only in quite exceptional cases will even the question of excision or removal be entertained.

The third variety is the one which, as already mentioned, is apt to be most misleading, both before and after the abdomen is opened.

I have seen a boy with a swelling over the right renal region which was mistaken for a sarcoma of the kidney, and even when the abdomen was opened the state of affairs was only arrived at when the tumour was *percussed*.

Three cases of tumour in women have also come under my notice, which were operated on under the impression that the tumours were uterine, and here again in each case *percussion* was of the greatest help in the diagnosis.

As to the fourth variety, when encysted exudation forms a tumour, it will at once be seen that a tumour may occur at any part of the abdomen and afford every difficulty for diagnosis.

As an instance I may quote a case of a woman who came under my care with a large abdominal tumour, dull all over except in the flanks—but with this exception it did not resemble an ovarian tumour. On incising the abdomen after opening the peritoneum the omentum presented itself, and had to be carefully incised. When this was done, a large quantity of clear fluid escaped—several quarts; at the back of the abdomen were the intestines. So that the fluid was encompassed by the omentum in front, and this was adherent right down to the flanks where the intestines were. It is only necessary that the fluid should be got rid of in these cases, and they do well.

Many more varieties of this wayward disease could be described, but enough I think has been said here to bring out the difficulties which occur in certain classes of it, and how these may be dealt with.

Tubercular peritonitis, with all its possibilities, is a most interesting disease. Fascinating to the diagnostician, to whose powers it gives full scope, and gratifying to the surgeon, in that so much good can be done by either an operation of the simplest kind, or, dependent on the variety, one which may call into play all the skill and ingenuity of a practised operator.

WITH DR. CHEADLE.

At the Medical Graduates' College and Polyclinic.

ONE of the cases was a child with a large head and large body, apparently, at first sight, backward in intellect, who presented the peculiar expression known as Mongolian. The question was whether it was merely a case of ordinary rickets and backward growth, or whether it was a case of cretinism or idiocy. The doctor under whose charge she was saw her two years ago. These cases when slight were often overlooked. The child was very fat, and had a depressed nose, possibly due to syphilis. There was no history of snuffles or of any eruption. It had a tumid belly, but it was not very rickety then. There was some enlargement of the joints, and some beading of the ribs. Dr. Cheadle had no doubt the affection was of the nature of cretinism, and that the administration of thyroid would very much improve it. One quarter grain of the thyroid should be given at a time, and this might be increased up to half a grain. Of course in this case, as it was not extreme, the thyroid should not be pushed so much as in a more marked case. It was interesting to remember that very great result was not obtained from thyroid administration until the temperature had increased above the normal, or until the child manifested a little diarrhœa or derangement of the stomach. The best test of the point of tolerance was the thermometer, which generally indicated fairly accurately when the limit of toleration was reached. In cases of sporadic cretinism the temperature was usually subnormal. The child also showed cretin-like hands. Dr. Cheadle thought he had traced some of these cases to maternal fright, and he had just been informed that the child's mother had a very great fright while she was carrying the child. He did not think it depended on syphilis, though it might depend on maternal shock. The prognosis was that improvement continued so long as the thyroid was continued, but if that was stopped for any length of time the condition returned. He had seen not long ago a case of that kind in a girl nine years of age, to whom he had been called in on account of an attack of diphtheria. She was a splendid child, one of the healthiest and most perfect-looking children he had seen, and yet he

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was told that it was a cretin when a baby, and that he had treated it as such. Apparently if the thyroid was continually given over a long period the recovery was perfect.

In another case of a child of three years of age the history was that a month ago it was very feverish and vomited, but had been quite well up to that time. Two days afterwards a doctor was called in, as the child was no better. He declared the illness to be pneumonia. Three weeks later there was very little the matter with the lung, but there was a slight cough. Three weeks ago she passed no urine for twenty-four hours, and then only a teaspoonful of what the mother called bright blood. There was vomiting and pain on micturition. There was a varying degree of pain, the tongue was bright red, the papillæ were prominent, the skin very dry, and there was tenderness on pressure over the pubes. The temperature was 99·2°; urine clear, acid, and many pus-cells found when examined microscopically. There was only the very slightest trace of albumin. The symptoms were not now much improved; the patient still vomited, was thirsty, and there was pain on micturition. The temperature was normal. The mother stated that the child had been very fat, but it was then very thin. There had been some consumption in the family on both sides. The child sweated a good deal at night. The mother had had nine children, of whom she had lost four. The case had all the appearance of tuberculous disease of the bladder, and it was recommended that the urine should be examined for bacilli, and then the bladder washed out with some antiseptic fluid. One of the most significant symptoms in the case was the rapid loss of flesh.

Another case shown was that of a girl aged four years, who had had attacks of facial erysipelas, always beginning in the nostril. She had had an attack three weeks before, and her features were evidently becoming altered by these recurrent attacks. The mother had taken the child to a hospital without result. The nose was not then tender. Ten years ago the father appeared to have had a very severe attack of erysipelas, but had only had the one attack. Dr. Cheadle pointed out that erysipelas hangs about a house, and particularly about the bedding, in a most extraordinary way. He remembered having a severe case of a very malignant form of erysipelas under his care at hospital. After the patient died the bed was well disinfected, and kept out of the way for weeks. It was eventually brought back and used in the ward, but the first patient who was put upon it afterwards contracted erysipelas. The mother said the child had gone to school at nine o'clock in the morning, and at two o'clock had been unable to see out of her eyes for the erysipelas, which took two days to subside. During the attack complaint was made that the affected region burnt very much. There were bad premonitory pains in the head before an attack. Dr. Cheadle said he had seen several cases of recurrent erysipelas, apparently not malignant and not involving any danger to life, which appeared to have been simply due to exposure to weather. The cases which were due to the weather did not start in the mucous membrane. One case in which there was rapid swelling of the face on one side was distinctly traceable to infection of the ear. It was in a person who suffered a good deal from gouty irritation of the meatus, and was in the habit of clearing it out with a brush, which she never took the trouble to wash. She had tumefaction of one side of the face and one ear. In some cases facial erysipelas returned year after year after exposure to cold.

The Leucocyte-count in Serous Pleurisy.—By Dr. J. L. Morse ('Amer. Journ. Med. Sci.,' cxx, No. 6). The author had a leucocyte-count made daily, from entrance until discharge or the disappearance of the fluid, in twenty cases of serous pleurisy. The cases were all primary, *i.e.* not secondary to any acute pulmonary disease. His conclusions are:—Serous pleurisy is only exceptionally accompanied by an increase in the number of white corpuscles, and then intermittently. The white count is of value in two ways in the diagnosis of serous pleurisy. If the physical signs are doubtful, and there is no leucocytosis, the condition is almost certainly not pneumonia or empyema, but serous pleurisy. If there is a serous pleurisy and a continuous leucocytosis some complication is present. The white count in serous pleurisy affords no information as to the duration of the process, the amount of the fluid, and its increase or diminution. The number of white cells is not influenced by the presence of blood or microscopical pus in the fluid or by the degree of fever.—*The Post-Graduate.*

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A CLINICAL LECTURE ON HEMIPLEGIA.

Delivered at the National Hospital for the Paralysed and Epileptic, Queen Square, London,

By DAVID FERRIER, M.D., F.R.C.P., F.R.S.,
Physician to the Hospital.

GENTLEMEN,—The subject of my demonstration to-day is hemiplegia. I need hardly say that hemiplegia is not a disease; it is only a symptom, just as dropsy is a symptom, although hemiplegia is often erroneously spoken of as a disease. Hemiplegia is a symptom of some destructive lesion affecting the motor centres or motor tracts for one side of the body; and anything that causes a destructive lesion of this kind will result in hemiplegia, which is paralysis of voluntary movement on one side of the body.

The causes of hemiplegia are numerous, therefore when you have a case of hemiplegia before you it is necessary to determine what is the probable causation. The motor centres can be destroyed by a traumatic lesion. Another common cause is tumour. But the most common causes of hemiplegia are those destructive lesions caused by hæmorrhagic extravasation, or by thrombotic or embolic occlusion of the middle cerebral artery or its branches. Anything that interrupts the continuity of the tracts which lead from the motor centres of the brain down the spinal cord will result in the same condition of hemiplegia.

The position of the motor centres is now common knowledge. I have here a human brain, presented to me by the late Professor Charcot which has been soaked in dilute nitric acid and then allowed to dry, so that it is only one third of the natural size. It shows the convolutions and fissures very beautifully. The motor centres of the brain practically surround the fissure of Rolando—the ascending frontal, the ascending parietal, and their extension on to the median surface. The motor tracts converge toward the internal capsule, and any lesion of the motor centres, or the corona radiata, or of the internal capsule pro-

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duces the symptom which we are discussing to-day.

I cannot show you a case of hemiplegia in its first stage in the lecture-room, because the patient would be unable to be moved from bed. Very often hemiplegia is ushered in with sudden loss of consciousness. While he is still unconscious you can often detect that the patient is hemiplegic because there is complete flaccidity of one side of the body. If you lift up the arm or leg the limb will fall heavily if unsupported, whereas on the sound side there may be appreciable resistance. In the early stages of hemiplegia you also see what is never observed at a later date, viz. conjugate deviation of the eyes. A patient lying unconscious, or semi-conscious, and paralysed on one side, has his eyes turned to one side, viz., the side on which the lesion is; he looks, so to speak, towards his lesion. Therefore, a patient with right hemiplegia has his eyes directed towards the left. The centres which move the eyes laterally are situated in the posterior part of the upper frontal convolutions. These centres or their tracts being damaged in one hemisphere, those of the sound hemisphere no longer antagonised, direct the eyes to the other side. This, however, is only a temporary phenomenon, lasting a day or two, and then passing away. These are movements which are centralised in both hemispheres, so that, as in all bilaterally co-ordinated movements, if you destroy the centres in one hemisphere, the paralysis is never of long duration, and can only be observed in the early stages of hemiplegia. The flaccid paralysis of the side opposite the lesion continues for a certain time, and then undergoes changes which I shall describe presently. Ordinary hemiplegia affects all the voluntary movements on one side of the body, viz., the face, arm, leg, and to a certain extent the trunk movements, but the last are not so marked as to excite particular attention.

As regards facial paralysis occurring in hemiplegia, there are certain features which at once distinguish these cases from those of facial paralysis due to a lesion of the facial nerves. I find that students are often at a loss to understand why a lesion on one side of the brain should affect the face on the opposite side. This is owing to their not having a clear conception of the difference between peripheral and central paralysis. Central paralysis and peripheral paralysis are two totally distinct things. All movements are centralised in the opposite cerebral hemisphere. Hence the face is affected, as well as the arm and leg, by a unilateral cerebral lesion. The facial paralysis which results from a cerebral lesion is distinct from the peripheral variety, in one feature particularly, viz. the practical escape of the orbicularis oculi. A patient who has paralysis of his face from cerebral lesion can shut his eye, but one who is paralysed in the face from a lesion of his facial nerve cannot do so. In hemiplegia movements are affected in proportion to their independence of the other side. As a rule we shut both eyes together. The movements are bilaterally organised, so that if you paralyse the one centre, the other is still capable of carrying out the movement on both sides. If, however, you look carefully, you will find that the hemiplegic patient cannot shut one eye so tightly as the other; and if you ask him to make a special effort to shut both eyes as tightly as possible, he does not tuck in the eyelashes of the paralysed side, showing that there is weakness of the orbicularis oculi, though not complete paralysis. The paralysis in cerebral disease is most marked at the angle of the mouth. This is best shown by asking the patient to show his teeth. Paralysis of the face in hemiplegia, therefore, particularly affects the lower facial region; the occipito-frontalis and orbicularis oculi practically escape. The arm is at first entirely powerless and flaccid; but, when the patient has recovered from the first stage, you will observe that the paralysis is not uniformly complete—that is to say, the limb is not affected equally in its several movements, some being paralysed more than others. The paralysis is in proportion to the degree of independence of the movements. Those which are most independent of the opposite side are those which are most paralysed; therefore the distal parts are more paralysed than the proximal, the fingers and wrist and hand being more paralysed than the elbow and shoulder. A patient recovering from hemiplegia is able to move his shoulder and elbow, and yet do nothing with his hand. The movements most paralysed are the extensors of the fingers, and they are also the last to recover. We have instances of this relative affection of the different portions of the limb in the cases I am going to show you.

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When we come to the lower limb we find that similarly the foot is more paralysed than the leg, and the leg more paralysed than the thigh; in other words, in the lower limb the parts which are least paralysed are the thigh and hip. The last part of the lower limb to recover is the foot, and the last movement to be regained is that of dorsi-flexion. It is a good plan to make a patient stand with his back against a wall and ask him to dorsi-flex his foot. If he can do this, he can do everything else with his limb. This is a valuable test of paralytic weakness of the leg, however slight in degree. In the majority of instances where a destructive lesion has occurred the parts never recover completely. In consequence of the destructive lesion, there occurs a descending sclerosis in the pyramidal tract, crossing at the decussation of the pyramids, and down the opposite side of the cord. With the occurrence of this pathological change there is an increase in what are called the deep reflexes, and ultimately the development of contracture, or what has been termed by Todd late rigidity. This is a condition which invariably arises in the limbs paralysed from organic disease if the lesion is of such a character as to actually interrupt the continuity of the pyramidal tracts, or destroy the motor centres from which they spring. It does not set in until two or three months after the stroke, and when it does occur it is incurable. But preceding the development of late rigidity you get an increase in the reflexes. The knee-jerk on the paralysed side is much more accentuated than on the other; and so are the periosteal reflexes, and tendon reflexes of the wrist, elbow, and shoulder. In the foot you get ankle-clonus. When late rigidity sets in the contracture becomes gradually more firm and difficult to overcome, till from the long-continued functional rigidity there is shortening of the tendons, and the limb becomes deformed, so that no amount of force will restore the natural position. Late rigidity gives a peculiar attitude to the limbs. The forearm is flexed, and the whole arm is adducted to the side; the wrist is generally pronated, the thumb bent, and the fingers clenched over the palm. If you try to supinate the arm you shorten the points of attachment of the flexors, and the fingers are clenched tighter; and if you try to straighten the fingers the wrist will flex more strongly. If you overcome the contracture in one direction, it will become greater in another. The foot tends to assume the position of equino-varus, or equinus alone. There is rigidity of all the muscles, and an old hemiplegic in walking circumducts his leg and scrapes his toe on the ground. That is the typical hemiplegic gait.

Another important sign of actual organic lesion has been demonstrated lately, viz. the character of the plantar reflex. It is a condition to which attention has been called more particularly in France by Babinski, and by Dr. James Collier at this Hospital. In the early stages of hemiplegia, that is to say in the flaccid stage, you may not get any response at all from plantar stimulation, but later on you observe a response of a peculiar character. Normally, if you draw your nail along the sole of the foot, there is a tendency for all the toes to flex; but when there is a lesion of the pyramidal tracts the response alters. Plantar stimulation causes extension of the big toe more particularly, occasionally also of the others. Thus you will get on the sound side a flexor response, and on the paralysed side an extensor response. Extensor response is a significant indication of organic disease; it is an indication of lesion of the pyramidal tracts. It is, in my view, the most important point of distinction that we have between functional and organic paralysis.

Hemiplegia may occur as a purely functional affection. In hysteria, often after an hysterical attack or emotional storm, the patient may become hemiplegic.

In hysterical hemiplegia, as was pointed out by Todd, though the limbs may be entirely paralysed, the face is, as a rule, unaffected. Occasionally, however, you may get on the same or on the opposite side a spasm of all the muscles of expression in the lower part of the face. Sometimes the face is so contracted on one side that the tongue cannot be protruded from the mouth at all. The patient may have this associated with paralysis of the limbs. It is, as Charcot has pointed out, glosso-labial spasm, not paralysis. There are very few cases, indeed, on record of actual paralysis of the face in hysterical hemiplegia. In organic hemiplegia, as a rule, the arm is more affected than the leg. In this respect it follows the rule that the parts which are most volitional are the parts most paralysed in cerebral disease. The arm is more volitional than the leg; one arm moves independently of the other, but the leg

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moves more in association with its fellow. In hysteria, however, on the contrary, it is the leg which is usually most affected. In hysterical paralysis you may find the leg completely paralysed, but the arm so far recovered that the patient can use a crutch to get about. Todd called attention to the peculiar character of the gait in hysterical hemiplegia, and it has been verified by subsequent observers; it is that the leg in old-standing paralysis is not circumducted, but dragged like an inanimate piece of matter. I shall show you this afternoon a patient, the subject of hysterical hemiplegia, who walks with a crutch, but still drags the leg quite helplessly. In organic cases there is always a good deal of movement about the big joints. The pelvic and shoulder regions are bilaterally innervated in each hemisphere. Hence, in organic disease there is always a certain amount of movement in these joints. Recollect, however, that changes are apt to occur in hemiplegic limbs; not only late rigidity, but also articular rheumatism, and this added to the rigidity greatly impairs the power of movement. Many hemiplegics would have a much better range of movement if more care were taken to prevent the limbs becoming set. When the limb is inactive for a long time arthritic changes are set up, and the patients are less able to move even their shoulders or hips than they otherwise might.

Hemiplegia generally occurs in adults, but it may occur in infancy—infantile hemiplegia. Sometimes it occurs at birth. More often, however, it occurs in the first year or two of extra-uterine life. A child has a series of convulsions, and when it wakes up the mother notices that it does not move one side of the body. This is the common history, and a hemiplegia of this kind is apt to be more or less permanent. Recovery, however, is more largely effected than in the adult brain. When the hemiplegia continues throughout life, one finds defective development on the paralysed side. For instance, the face is smaller on one side than on the other, and the limbs are shorter, as well as limited in their movements, and contractured.

Hemiplegia may be entirely motor; but it is often associated with loss of sensation. As you know, in the internal capsule the motor and sensory tracts are very closely related, the anterior part of the posterior division being the motor area, and the posterior part being the sensory. Therefore when there is an extensive lesion, such as hæmorrhagic extravasation ploughing up the corpus striatum and surrounding structures, you are apt to get a combination of hemiplegia and hemianæsthesia. Therefore, with paralysis of motion, there may be a relatively large amount of paralysis of sensation on the opposite side of the body. The affection of sensation may be only tactile, and more particularly the sense of localisation; or it may extend to loss of the sense of pain. When sensation is affected, it has the same distribution as the motor paralysis, that is to say, it is most marked in the parts which are most volitional. Frequently with hemianæsthesia there is also hemianopsy. This is a significant indication of organic disease. Many cases of hysterical hemiplegia are associated with hemianæsthesia, but here there is crossed amblyopia with blunting of hearing, smell, and taste. The hemianæsthesia in hysterical patients extends to touch, pain, and temperature, and you may excite the muscles with the strongest current without the patient feeling. Never in organic disease have I seen anæsthesia so marked as that.

Let me now show you some patients illustrating some of these remarks. I first show you three cases of hemiplegia which have lasted respectively four years, five months, and three months. Therefore they have all had time to develop late rigidity. The man who has been ill three months cannot move his hand at all, though he has a good deal of movement in his shoulder. You notice that when I strike his shoulder there is a distinct clonus. There is also a slight wrist-clonus, and there is also a tendency to clenched fingers. You see that if I supinate his hand forcibly the fingers are clenched more than ever. If I try to straighten his fingers the wrist becomes more flexed.

This patient, who has been affected four years, has arthritic adhesions, and when I lift up his arm I hear the joint crack.

The man who has been hemiplegic three months has symptoms of systolic murmur at the apex. Young people may have hemiplegia from embolism any time, but in the absence of cardiac affection, or renal disease, the most probable cause is specific endarteritis; this is a very fertile cause of hemiplegia in young adults.

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The man who has had the affection five months is an instance of syphilitic endarteritis. He is forty-two years of age. He cannot lift his shoulder. There appears to be complete loss of power, but he would be able to move his shoulder were it not for the arthritic changes. He can do nothing with his hand; he has wrist-clonus, his fingers are clenched, and if I supinate the hand the flexion of the fingers increases. The limb is quite flaccid while he is asleep, but as soon as he wakes and gets about it becomes stiff. In yawning he stretches out both hands, the paralysed limb as well as the other. The rigidity is intensified by active muscular exertion. Strong exertion with the sound limb will tend to make its fellow move in sympathy. When I ask this patient to grip my hand as tightly as he can with his sound hand, you see the other arm moves in response to the effort. Even in the patient who has been paralysed for four years the other arm moves in association. I now show you the extensor response to stimulation of the sole of the foot which I mentioned earlier in my remarks.

The next patient I show you is one of infantile hemiplegia. If you look carefully at this boy you will see that one side of his face is more developed than the other; the right cheek is not so full as the left; it looks as if a layer had been shaved off. This can be observed better by holding a piece of paper vertically down the middle line and comparing the two sides. He has pronation of the wrist, and the arm is semi-flexed at the elbow. One arm from the tip of the fingers to the shoulder is shorter than the other, and so in the leg. He has talipes equino-varus. As the young patients grow this deformity becomes accentuated, so that they are obliged to wear a higher heel; otherwise they get secondary curvature of the spine. These cases of infantile hemiplegia nearly always become epileptic later on. They also frequently exhibit various degrees of imbecility or idiocy, though not a few are well endowed with intelligence.

I now show you a female patient with functional paralysis. She is not now hemiplegic in the ordinary sense. She has no affection of the arm, but she has a useless and flaccid leg. In cases of hysterical hemiplegia the muscles will remain flaccid for months and even years; there is no necessary exaggeration of knee-jerks, no ankle-clonus, and the muscles react normally to the faradic current. As this patient walks round you see she drags the left leg quite uselessly along the floor. There is no sign of movement in that leg at any joint. There is no loss of sensation, no hemianæsthesia, and none of the ordinary stigmata of hysteria. There is no increase of knee-jerks, no ankle-clonus, and I think there is a slight flexor response to stimulation. The condition has lasted a year. Of course if it had been an organic case there would have been late rigidity long ere now.

I now show you another female patient with hysterical hemiplegia. Her leg is not so much affected as that of the patient you have just seen. She walks on the outer edge of her foot, and she has a very remarkable anæsthesia of her left arm, which is characteristic. It is ten months since she became affected. There is no contracture in the leg. She can move her left arm fairly well. You see she is quite insensible to pin-pricks on her hand and arm on the left side. She has "sleeve anæsthesia," that is to say, anæsthesia extending from the shoulder-joint downwards, like the sleeve of a dress. Such a distribution of anæsthesia is pathognomonic. She has never had any affection of the face. There is slight constriction of the fields of vision, so that she has some of the hysterical stigmata. Sometimes the field of vision of these patients is contracted almost to blindness; often the loss of colour-vision coincides with that for ordinary vision. She has the flexor response to stimulation of the sole of her foot.

I now show you two cases in which we have a combination of hemiplegia with hemianæsthesia, in one of whom there is also hemianopsy. This is a man aged sixty-five, who, fourteen months ago had a sudden attack, and was paralysed on the right side, both as to motion and sensation. He still has a slight degree of hemiplegia, slight hemianæsthesia, and right hemianopsia. In these cases, as I have explained, the lesion involves not only the motor, but also the sensory tract. He also has hemiplegic arthritis, with painful contracture. There is albuminuria in this case.

The last patient I have to show you is not an ordinary case of hemiplegia; it is rather one of crural monoplegia. He is slightly weak in the arm, but the disability is chiefly in the leg, which is unusual. Probably his disease affects chiefly the leg centre. He cannot dorsi-flex his foot. He

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has rigidity and all the other signs of organic lesion which I have mentioned.

Complications of Cholelithiasis.—From a study of the relation of cholelithiasis to disease of the pancreas and to fat-necrosis, E. L. Opie finds that, where anatomical conditions are favourable, disease of the pancreas may occur as a complication of cholelithiasis when a calculus passes along the common bile-duct. The lodgment of a stone near the orifice of the bile-duct, where it may at the same time compress and occlude the duct of Wirsung, is not uncommonly a cause of pancreatic lesions and disseminated fat-necrosis. Should a calculus become impacted in this position, one of several conditions may result:—1. An individual, usually in fairly good health, with perhaps a history of previous gall-stone colic, is suddenly attacked with pain in the epigastric region, accompanied by vomiting and followed by collapse. Death follows usually within forty-eight hours, and at autopsy gall-stones are found in the bile-passages, while that one which caused the fatal attack may be still lodged in the common duct near its orifice. The pancreas is enlarged and infiltrated with blood. Foci of fat-necrosis are usually present. 2. A fatal termination may not follow rapidly the symptoms mentioned. Pain in the epigastrium persists, jaundice may be present, and a tumour-mass above the umbilicus may indicate a probable lesion of the pancreas. At the end of one or more weeks or months death occurs, often with symptoms indicating the presence of suppurative inflammation, presumably in the neighbourhood of the gland. At autopsy the diagnosis of cholelithiasis is confirmed by the presence of gall-stones in the gall-bladder or in the bile-ducts, and occasionally the offending calculus is still lodged near the junction of the common bile-duct and the duct of Wirsung. The pancreas is dry, black, and necrotic, and evidence of previous hæmorrhage may be present. In the wall, and often widely disseminated in the abdominal fat, are foci of necrosis. Since the individual has survived the primary lesion, opportunity has been given for the development of secondary changes in the injured pancreas and neighbouring fat. 3. In certain instances long-continued or repeated obstruction of the pancreatic duct by gall-stones does not cause the acute lesions described, but produces chronic inflammatory changes.—*Amer. Journ. Med. Science.*

WITH DR. SAVAGE AT BETHLEM ROYAL HOSPITAL.

VI.

On Puerperal Insanity.

GENTLEMEN,—To-day I purpose taking up another special set of cases, this time to illustrate puerperal insanity. First of all I have to say that there is no definite disease which deserves the name of puerperal mania. One has, however, to recognise that there are some people who seem to be especially liable to break down at certain periods of life. I have told you before that the term *epochal* insanity has been used; that cases of insanity associated with the onset of menstruation and with pregnancy, as well as with parturition and the climacteric, with conditions of irregular menstruation and with ovarian disease, have a general resemblance, and for convenience one groups them together. Then we may consider special groups of such cases, that is to say, insanity associated with pregnancy, with delivery, and with lactation. Whether the disorders occur during pregnancy, after delivery, or after lactation, the similar causes almost always give rise to similar symptoms. It is well to remember that these patients may have first an attack of insanity after delivery, then an attack after a second and third delivery, and then they may become still more unstable, and suffer from attacks of insanity during pregnancy. They may, perhaps, after a lapse of time, get through a pregnancy and delivery, and only break down with lactation or weaning.

In puerperal insanity there are two great causes to be considered; one definitely a moral cause, the other as definitely a physical one. For instance, the moral cause, and one that is most potent, is insane inheritance. I have pointed out already that there are certain types of mental disorder which are more frequently dependent upon heredity than others, and that there are certain other forms, such as general paralysis of the insane, which are but slightly dependent upon neurotic inheritance. I have told you already that in melancholia we have frequently a true inheritance of melancholia, so that people when they come to the age of degeneration develop suicidal and melancholic tendencies. So there are certain

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families in which puerperal insanity and the tendency to it are very marked indeed. As I have said before in relationship to suicidal tendencies, we must not attribute too much to the coarse material heredity, but we must also look to the idea of expectancy. Take such an example as this:—A woman has an attack of puerperal insanity; she has also a second attack. Of the children one is a girl. Her mother, when she comes to the climacteric, breaks down again, and then for the first time the daughter, now approaching adult life, hears of her mother's breakdown at childbirth, after her own birth and also after her brother's birth; in fact, she knows full well that she had attacks of insanity after childbirth. This young woman marries. For the whole nine months of pregnancy she is wondering whether she will break down, wondering whether she will be like her mother. It is like suicide. A person whose parent or relative committed suicide wonders, when he gets depressed, whether he is going to do the same sort of thing, and so he prepares the way to a breakdown. So if you have a person who is neurotic by birth, with the expectation that he or she will break down under certain conditions, it makes a very ready path for descent into that disease. Inheritance, then, is a very strong and potent influence in the production of puerperal insanity; and it acts in two different ways: by first providing an unstable person, and secondly, by giving a cause for attention and expectancy as a preliminary to further disorder.

The next cause is distinctly physical. I shall have to point out to you that a certain number of cases of puerperal insanity depend upon septic causes. And there, again, you not infrequently have the unstable neurotic individual who seems predisposed to develop some septic illness, not, perhaps, of a very severe type, but severe enough to produce delirium, and, as I have told you over and over again, anything which will produce delirium may produce delirious mania. One sees a certain number of cases of puerperal insanity dependent upon septic causes, and with these septic causes you get certain other symptoms. There is suppression of lochia, suppression of milk, irregular temperature, a great deal of sweating—very often sudamina,—and you get very grave symptoms associated with pneumonia, and even local joint diseases and liver abscesses. Fortunately not very many cases of puerperal insanity are associated with septic causes, or else the rate of death would be greater than it is. Puerperal insanity, then, is a disorder which may occur before, during, or after delivery. I shall have to refer to different groups later.

There is another cause or contributing condition. One may take it for granted that the more physiological the process, such as pregnancy and delivery is, the less likely is there to be nervous breakdown; therefore the danger is greater if the first pregnancy be rather late in life. If the neurotic woman becomes pregnant between thirty and forty, the nearer forty the greater the danger. Although the labour itself may be perfectly normal, yet there is special danger to the neurotic individual if the pregnancy and delivery be what one may call rather unphysiological. In the same way there seems to be special danger in neurotic people who have had children, and bear other children, at a late age. Say a woman has one, two, or three children between the age of twenty and thirty, and then at the menopause—somewhere about forty-five—she has another child. There is special danger then. Of course in the last cases you have to look again not only at the physical, but at the moral cause. For instance, a woman waits twenty years, and has adult children, and perhaps even grandchildren; and then she has another child. She feels ashamed of her pregnancy; she worries about it, and there is a great deal of anxiety besides, because of the unphysiological time of the affair.

In all these talks I have tried to trace the development from the natural to the morbid; to show how the delirious person may become maniacal; the depressed person may become melancholic; the person who has been unstable and neurotic, may develop almost naturally a morbid suspicion, and have delusional ideas of persecution; a neurotic person may have longings which may develop into insane longings. So, just as one sometimes finds the most *bizarre* and extraordinary longings in pregnancy—so that the person will eat chalk, slate pencil, or coal,—one may get the same thing exaggerated into insanity in the early months of pregnancy. In some cases I have seen conception absolutely marked clearly off by a change of temperament. And it is also important to re-

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member this, that a person who has been during her ordinary life a perfectly sober person, with conception may become a drunkard. You readily recognise the other neurotic symptoms which may occur; the neuralgia of pregnancy may be so bad as to interfere with sleep, and thus cause nervous breakdown; you may find exaggerated or mistaken ideas about food, so that the individual may misinterpret the physiological symptom of morning sickness. Take as an example a woman who was in this ward some years ago who, having been pregnant and suffered from sickness, became insane after the first two pregnancies. The third time she became pregnant she had the usual sickness and symptoms which she had before; but in addition, this time being more unstable on account of having had the two previous attacks, she suspected her husband of giving her something to make her sick—that is to say, she misinterpreted the simple physiological sign of pregnancy, and believed it to be a symptom showing that she had been poisoned. Such individuals will not infrequently become jealous and suspicious, and they will absolutely refuse their food. They will assert that the food is poisoned, or that there is something wrong with them, which prevents them from taking food. It is under those conditions that you may get extreme melancholia, and there may be also suicidal tendencies. Therefore we must say that with conception there may be a sudden change of temper and of temperament; that with the earlier months of pregnancy there may be various forms of disorder, especially those belonging to neurotic families, or those who have had previous attacks of insanity. The individual may have an attack—not generally a very acute one—of this mental disorder of pregnancy, which may pass off pretty early. Just as the sickness commonly disappears when the pregnancy is advancing into the fourth month, and just as the other distressing symptoms may pass off at about the same time, so the whole of the mental attitude may be changed, all the morbid symptoms may pass off with "quickening." Therefore—although I am not talking much about treatment to you now—it is interesting to know that it is little or no good to produce abortion in these cases. Although the insanity is associated with the pregnancy, yet if the patient—being insane in the first or second month of pregnancy—aborts, the chances are that the mental disorder will still go on for a time. I have seen the experiment tried of producing or inducing abortion, but the result has never, to my mind, been satisfactory. I have been told by certain gynæcologists and others that now and again the result has been satisfactory, that this course is a successful one; but I am afraid that in the majority of cases there was a convenience, rather than a morality, which ruled it. There may have been a large number of children already, which, combined with the risk of this child being weak-minded, rendered it a justifiable experiment to destroy this particular child. Then, although in the majority of cases the insanity of pregnancy comes on in the early months of pregnancy, a certain number seem to break down in the later months. This may occur at the sixth or seventh month of pregnancy, especially if the woman belongs to a nervous stock, has had previous attacks of insanity, and if she has had special stress, worry, and anxiety. Probably another cause, both predisposing to the attacks in the later and in the earlier months of pregnancy, is frequent pregnancies and prolonged lactation. A nervous person is more nervous if she is brought down by physical exhaustion. In the later months of pregnancy, if insanity develops it is almost always of the melancholic type. I have told you that in the early months there is generally distress, and in the later months you may take it that the cases are associated with mental depression or mental exhaustion, so that the patients are either melancholic or stuporous. This also is interesting in relation to what I have already told you as to abortion—that if the insanity occur in the later months it does not pass off after delivery. Delivery takes place, but some time elapses before the mental balance is restored. So it is of no use to induce abortion in the early months of pregnancy, and it is equally useless to induce premature labour in the last months.

Let us now go on to the more ordinary cases of puerperal insanity, that is to say, the insanity following delivery. The majority of cases which come on within the first week are maniacal—all cases coming on within six weeks of delivery are considered to be puerperal,—those which come on between the third and sixth weeks are more depressed and melancholic. One would say that there, again, the actual course plays a very important part in the nature of the symptoms. Nearly

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all the septic cases come on within the first week or ten days after delivery and, as might be expected, these cases are more delirious and maniacal than depressed. Therefore it is important to remember that the earlier cases are the cases associated with the largest amount of excitement.

What are the physical and mental symptoms that mark and characterise puerperal insanity, truly so called? I should say first of all active sleeplessness. I have told you before, when speaking of melancholia, that there are qualities of sleep, and so there are degrees of sleeplessness. The person who is going to break down with puerperal insanity complains of absolute sleeplessness; it is not only the mere lying unable to sleep, but these people are miserable and restless, and complain of sleeplessness as an active symptom—"Oh, if I could only sleep; it is sleep that I want!" Sleeplessness is associated with a badly-nourished brain; therefore in some of these cases you get more good by food than by hypnotics. The result of the sleeplessness and further malnutrition of the brain leads to irritability, and inability to put up with the slightest inconvenience in the surroundings, so that there is intolerance of noise. The patients grumble and complain of the nurse; they begin to look upon the occasional crying of the child as a nuisance, and upon the child as a trouble for causing it, and accordingly they turn against both nurse and child; and finally, they turn against the husband as the cause of the lot. They are first sleepless, and then they become irritable, and then they become antagonistic to nearly all the people about them. Then there come other local manifestations, distaste for food, frequently refusal to take food, and not infrequently there is local irritation about the genitalia, with erotic feelings and expressions, resulting in the most refined person making use of filthy and blasphemous language. In fact, you find the ordinary symptoms of acute mania, which may follow either the delirious type or the emotional hysterical type. It is well to remember that the duration of this disorder varies very considerably. One is in the habit of saying that three or four months of acute mental disorder is about the average. And it is important to remember that puerperal insanity very frequently exhibits a typical course. First of all there comes sleeplessness, with a period of depression, and a feeling that all things are troublesome; it is a slight stage of melancholia. Sometimes the stage is more pronounced, and continues for some time. Sometimes nothing but the depression, and sleep lessness, and restlessness continue, the maniacal stage never being reached. Next comes the stage of excitement, with some increase of temperature if there be septic trouble, otherwise no increase of temperature. If there is septic trouble you find other bodily symptoms, such as suppression of lochia, and suppression of milk; and it is an interesting fact that in many of these cases where there is suppression of milk there is a temporary appearance of sugar in the urine without any polyuria, a passing symptom. After the period of excitement there comes the period of exhaustion, so that the patient passes practically into a stage of dementia. Thus the three forms of mental disorder which we have already described—melancholia, mania, and dementia—are all represented in the one case. After this stage of dementia it seems as if the nervous system and the general muscular and bodily system all improve up to a point, but that they do not improve absolutely; the person gets fat and indolent, and develops a large appetite and general indifference. There is almost always amenorrhœa. Thus there is lacking full restoration. It is interesting to note that there is not exactly any longer antipathy, but only apathy, so that a person recovering from an acute attack of puerperal insanity passes into a will-less uninterested condition. You may ask such a patient "Do you want to go home?" and the reply will be "Oh, I do not mind." You follow that up by asking, "You are not anxious about your children?" and the answer is "No." I have referred over and over again to the patient who said she disliked me particularly because I removed her from an asylum. She said, "In the asylum I have people to look after me and attend to my wants; I have no duties to perform, and no responsibilities, no crying children, and no troublesome husband. Here I am resting quite happily." That was an abnormal condition; she had become fat and flabby in both mind and body, and it required a considerable amount of breaking down of adhesions before one could get her into the normal state again.

With the various conditions which I have referred to you get other symptoms. You may

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get delusions as to food, you may get hallucinations of the various senses; and the more delirious the patient is the more likely are there to be hallucinations of sight. As I have said before, with the acute delirious mania you get a large proportion of patients with hallucinations of sight. With melancholic patients the hallucinations are more those of hearing. But in both classes you often meet hallucinations of taste and smell, bearing out what I have already told you, that with disorders of reproductive organs there are constantly hallucinations of this type. I have told you that in cases of climacteric insanity it is one's constant chance to meet with people who have most marked hallucinations of taste and smell. Puerperal cases of the acute and septic type produce a larger proportion of deaths than the others. If you take all cases of puerperal insanity, only 4·35 per cent. die; but if you take those occurring within the first week after delivery, my experience would lead me to state the percentage at seven or eight. In referring to these cases it is also well to remember that some causes which you might expect to produce insanity do not. In the Franco-Prussian War of 1870-71, the statistics showed that there was a marked decrease of insanity in France. Where there is great trouble there is a marked decrease in insanity. The same thing holds good of the individual. Extremely severe labour, perhaps instrumental, associated with laceration and the rest, does not frequently give rise to puerperal insanity. If you take the cases of puerperal insanity you will find that by far the greatest proportion follow ordinary simple straightforward deliveries. I do not profess to give an explanation of this, but it is very important. Dr. Clouston, on the other hand, has said that he thought, in his experience, a certain proportion of the cases were distinctly due to instrumental or difficult labour. I can only say, after collecting many hundreds of cases, that my experience does not agree with that.

The symptoms already spoken of are change of manner and carelessness and neglect of the child. Then come the various symptoms of mania, and following that what probably depends upon local causes, namely eroticism, with a feeble pulse and weak bodily health, suppression of lochia, and in septic cases increased temperature. The prognosis is good in a large proportion of the cases.

The real reason for my taking this subject now is, that it enables me to gather together the points of so many other forms of disorder, and it forms a very good ground to discuss what may be called the true neurotic insanities, and also the toxic insanities. Here we have a woman who has not been in very long, that is to say six months. She has a little child eight months old. She has five others. She has always been healthy before. She tells us that she broke down through her confinement. She has now four boys and two girls. She says she was suffering from delusions after the birth of the child. In passing, one would remark that it is important and interesting to remember that what we call insanity may be, as it were, the flower of the root that is deeply planted. The non-botanist goes along and sees mushrooms and toadstools, and looks upon them as plants, whereas, of course, the mycelium which is running all through the soil is the plant, and what is seen is merely the exhibition of the plant's reproductive activity. And so in many cases of puerperal insanity the neurotic mycelium has been present, and makes itself evident in insane offspring. A person of unsound mind is brought to me with the history that his mother had an attack of insanity after his birth. The woman has three other children living and healthy. From some cause she breaks down mentally with the fourth, and the child is neurotic or imbecile, although apparently the mother did not exhibit any nervous symptoms until after his birth. So you understand what I mean when I say that there seems to be a kind of neurotic mycelium, which may give rise to other neuroses before the condition exhibits itself in the individual. This woman before you says she slept very well. The child was healthy, and she nursed it; she had plenty of milk and the child took it well. It was a quiet child. She had an acute delusion about her husband. You will notice that she is very disinclined to talk. She is said to have threatened to kill both her husband and her child. She was industrious and careful, but nervous. One of the predisposing causes and one of the symptoms may be drink. Just as certain patients have a kind of "longing" for drink, certain others, especially of the neurotic and intolerant type, very readily take to alcohol, and that may be another predisposing cause. You will sometimes see a

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neurotic person who hates the trouble of pregnancy, a person who, in the lower middle class, has to look after the children and still go on with the morning sickness and misery. It is not a surprising thing, under these circumstances, that such a person takes to alcohol more than she should do, and it is not surprising that such a person should be predisposed to break down after delivery. This woman has had one miscarriage, but there is no history of syphilis; the catamenia have been normal. One asks what are the sexes of the children, especially when there has been a series of births without the mother breaking down. Now and then you get —why I do not know—a woman who will break down after the birth of say, boys only, or after the birth of girls only, and one has met with extraordinary or insane longings which have been associated with pregnancy with one sex and not with the other. The history of this case goes on to say that, soon after the birth of the child, she became sometimes strange in her manner. She suspected her husband of infidelity, and thought that he was paying attention to another woman. She showed a dislike to her husband and to her children. She said that two lady lodgers wished to kill her by putting poison into her food. Those facts are both interesting in relation to puerperal insanity. First there is dislike to husband; then there comes the correlated idea of jealousy, and then the related idea that two women in the house want to poison her, possibly for the same reason, to get rid of her and marry her husband. Therefore, we have very well marked symptoms, though these are not special to puerperal insanity. She said she felt some peculiar influence which made her desire to strangle her baby and cut her husband's throat. She not only had these ideas, but she was inclined to act upon them. She admitted she talked to imaginary people, and also that she had secreted a skein of thread in her bed. The history shows that when admitted she was very untidy; that she was confused and had a timid manner, clinging to the attendant as if she was afraid some harm was going to be done to her. Later on she appeared to be suspicious. She only reacts slowly to questions, but always answers them to the point. You can see that her general attitude is one of partial weak-mindedness. She may or may not have had these delusions, but she thought she had had them. One would be inclined to look upon her as slowly improving, that she is passing into a condition of partial weak-mindedness, and that her physical health will improve before her mental health. That is another important thing to remember, that the general prognosis of nervous cases is bad when the machinery improves yet the functions are not restored, when the mental and physical gains do not coincide. If you get a patient who is an active healthful woman, who has been a good mother and wife, and who has had an attack of puerperal insanity, she gets fat and strong, and yet she may no longer be able to fulfil her domestic functions. The physical part has been restored, but the mental does not work well. A certain proportion of the cases of puerperal insanity are never the same again, that is to say, they are mentally crippled. It is well to remember that a certain number of these cases are crippled as long as they are in the hospital, but when you send them out, and thus break down the adhesions, they get all right again. Sometimes it requires this course, the restoration to home, to shake up the machinery, to set the works going normally, and therefore one frequently recommends that patients who are not quite well should be removed from the Asylum, because they have been in it long enough.

There are a number of other points in relation to insanity of pregnancy and childbirth which one has to pass over rather cursorily. I have told you some patients are maniacal from the outset; some people are melancholic from the outset; some are weak-minded from the outset; but the typical case of puerperal insanity begins with depression, passes into excitement, and ends in temporary weak-mindedness. Nearly all the symptoms are correlated to the environment of the individual. The woman becomes sleepless, becomes jealous and suspicious, and dislikes the nurse, the child, and the husband. Then later, not uncommonly there is a result of local trouble, eroticism; and there is jealousy, and sometimes an important symptom, namely, mistaking of identity. What the real basis of that is I do not quite know. There seem to be two conditions under which the mistaking of identity may be seen, that is to say, in anæmic conditions, and after acute disorders, which appear to prevent the patient making a true image of the person brought before her; and the

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fact of not having a clearly-defined image seems to lead the person into doubt as to which class it belongs to. I may, with defective spectacles, shake hands with somebody whom I may think to be A, B, or C, whereas he may be D; all have a general resemblance, and my spectacles have not enabled me to focus them properly. In the same way there is intellectual sight; there is an impression received, but not fully registered, and the result is a confused and blurred image, and therefore a mistaken identity. These people not infrequently mistake the doctor for their relatives, and may kiss him, or wish to do so, under that impression. Remember that a large proportion of these people get well mentally, sometimes after they have got well physically.

Now with regard to the other type of puerperal cases, those which come on after the first fourteen days, and before the end of six weeks. Nearly all those cases are suspicious or melancholic. They are nearly always on the depressed side; they think everything is against them. As a result they are sleepless, and they have suspicions about their food; they are suspicious about their husbands and their children, and that type of woman not infrequently kills all her children. They are depressed, sleepless, and miserable, thinking they are in the way, and that by having children they have added to the insane population of the country. They think they have done harm by having one child more, and that their children would be much better out of the way and out of the reach of trouble. These people often refuse food, are in bad general health, and take a considerable time before they recover. Just as an ordinary case of puerperal insanity coming on in the earlier months is typically maniacal, so the individual in whom puerperal insanity comes on after the first fourteen days, and between then and six weeks, is almost always typically a melancholic patient, and requires to be treated as such. She develops different delusions according to her age and her surroundings, and nearly always of the same type. She believes she is unworthy, that she is no longer cared for by her husband. Just as she, in the earlier stages, may have taken an antipathy to her husband, so in this later stage she almost always thinks that her husband may have taken a dislike to her, and that her children no longer care for her. In these cases now and then you will find some uterine displacement, or some subinvolution of the uterus, but I think that is comparatively rare. It is certainly a very rare thing for you to be able to cure the patient by treating the uterus alone. These cases take rather longer to get well than the maniacal ones. The principle of treating them is, as you might expect, by giving them stimulants and food frequently, and they should have "nourishing stout," whatever that may mean, but stout seems very often to suit these people. If they are teetotal, one gives them maltine and malt extracts, bynin, and the rest. It is necessary that a certain amount of definite exercise should be taken, and as soon as you can get them sufficiently well and free from delusions that are likely to be harmful to themselves or to their husbands, you can get them back to their families, and the sooner they can resume their family duties the better for their condition.

The next group of puerperal cases consists of those coming on after six weeks from delivery, I do not say six arbitrarily, for it may be six weeks, or it may be eight weeks afterwards. The best way is to look on them as dependent upon or associated with lactation. And here all that need be remembered about the pathology is that it is a pathology of brain exhaustion, and that the term neurasthenia is better observed here than in almost any other condition that I know. A very interesting point is that in many of these cases you find loss of feeling, and that is very characteristic of many of the disorders associated with the reproductive functions. I saw a patient yesterday who said, "Shall I ever, in this world, have any more feeling? I am absolutely dead as far as sympathy and affection are concerned. I get up in the morning, and I see my children go to school; I see to the house duties, but I find no real interest in them. I receive my husband when he comes from the City. But it is all outside me; I do not feel as if I were a participitator in all this; and if anybody said to me do you care for what is going on, I should say you may just as well ask me whether I care for a magic lantern show. It is a show; there is no affection whatever." I said to her, "Do you take your food?" and she replied, "Oh yes, I eat it." "Do you eat enough?" "I never know when to stop; I have no desire for food, neither am I satisfied when I have done eating." "Do you sleep?" "Oh yes, I sleep like a log; it is not really sleep, it is

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insensibility." Such a patient has widely dilated pupils, with a fair development of body, with functions apparently normal, but with amenorrhœa, menstruation not having been re-established since the delivery of the child. In all these cases there are the aches and pains, the will-lessness associated with amenorrhœa. In nearly all these cases the only treatment you can carry out is the administration of stimulants and the procuring of rest. Not infrequently as a result of lactation, sometimes where there has not been lactation, but where the menstrual function has not reappeared at the end of a couple of months after delivery, you get this type of neurasthenia with melancholic interpretations, and the only treatment, as I say, is the administration of tonics and stimulants. Here comes one of the most difficult questions from a pathological point of view. What is the difference in the nervous system of a woman with all this deadness, such as I have described, and the same woman who, perhaps half an hour afterwards, suddenly recovers? I remember such a woman being in one of these wards, who after the midday meal went to sleep. Half an hour afterwards she said she would like to see me. I went to see her, and she said "It is all gone; I went to sleep dead, without feeling any interest in anything, or any sympathy. Now it is all gone, and I am perfectly well." You may also have heard me speak of a patient who attended here as an out-patient. After her fifth or sixth child she passed into this condition of apathy and want of feeling. She said, "I have come here because Dr. Russell Reynolds said you would see me; but it is no good you seeing me, or any other doctor; I have no love, or sympathy, or anything. If my children were ill I should not mind; if my husband died it would be inconvenient, but I should not feel any pang." Menstruation had not returned after delivery. I gave her tonics, such as iron and Griffith's mixture, with exercise, and tried to establish hope. As I told her, "the infusion of hope is the best drug I know." She used to say it was no good. She came to me one day and said, "My child is dying, but I promised I would come to-day, and I have come." She came a fortnight afterwards, and said "My child is dead and buried, but I do not mind." She came a month afterwards dressed in black, and tears burst from her eyes when she began to talk; she said, "It is all right now." I said. "When did you menstruate?" She said, "Two days ago for the first time." The whole thing had cleared off completely, and there was a return of feeling with the return of the menstrual function; that is to say, it was related to the higher nervous condition. These cases are depressed, and very often jealous and suspicious. They not infrequently have ideas that their husbands are unfaithful, and in many ways they are highly troublesome.

There is one other point in passing; remember that with the onset of the milk there may be ephemeral mania, just as you may have an ephemeral febrile attack. In the earlier period of my medical career I knew what it meant to have anxiety about these cases when a day or two after delivery the temperature went up, and the patient had a flushed face. There may be in the same way ephemeral mania. Now and then I have been asked to go considerable distances into the country to find that what looked like an attack of acute delirious mania passed off with a free purge. So you have to remember that there is such a thing as ephemeral mania, which may occur occasionally with the onset of milk. I regret to say that instead of getting kudos for these cases, the doctor, as a rule, gets blamed for having sent for a mental specialist when there was nothing the matter.

We were to see another patient, but she cannot be persuaded to come before you. She has had two or three attacks of insanity dependent upon puerperal conditions, and now she gets attacks dependent upon some other exciting causes. That is incidentally a point of importance. I have already told you that a person who has had one attack of puerperal insanity is very likely to have other attacks of insanity. I would finish with this caution:—Remember that just as the individual runs great risk if she knows her mother suffered from puerperal insanity, so the person who has had one attack of puerperal insanity is much more liable to have another attack of puerperal insanity, because she thinks of the past and expects such an attack. But such dread may wear out. Fortunately memories do wear out, and I will give you this example. A lady was in Bethlem Hospital after two separate attacks of puerperal insanity. She then became so unstable that she broke down in the third pregnancy. I said there were to be no more children. There were no more children

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for five or six years. I met the husband one night, and he said, "There are only three girls, and I have no heir." I said, "How long since your last child?" He said, "Five years." I said, "All right; I think you may encourage your wife to believe that she will not break down with the next child." She had two or three children after that, and did not break down with any of them. She had been having a child and breaking down, having a child and breaking down, until she had made up her mind that she must always break down. I suggested that she would possibly go through the delivery after five or six years' interval satisfactorily, which she did. This is an important fact to remember.

You will recognise now the importance of the whole relation of the subject. It forms, one may say, the text upon which to hang nearly every symptom of insanity.

Treatment of Chorea.—Levy says that experiments made by Dr. Chapuis in 1879 demonstrated that arsenic is much less toxic in its effects when given with butter than when taken in solution. Numerous observations on this point have been personally made with the view of determining the best mode of preparation and administration of the mixture, resulting in the recommendation that 10 grammes of butter be employed, and to this be added the total amount of arsenious acid which it is intended to use in the treatment of the case, together with common salt in such quantity that 0·1 gramme of salt corresponds to 0·005 gramme of arsenious acid. The dose of arsenic given on the first day is 0·005. The quantity is increased by 0·005 gramme per day until a maximum of 0·03 gramme is reached, when the dosage is gradually diminished. The quantity is, however, given in a single dose, and it is repeated every second day only. In examining the notes of 312 cases of chorea treated at the Manchester Clinical Hospital for Women and Children, in most cases with large doses of arsenic, Railton finds that four patients suffered from arsenical neuritis. The patients all made a good recovery. It is thought that the occurrence of neuritis in those predisposed to such affection depends on the total quantity of arsenic administered, rather than the length of time during which the treatment is continued.—*Monthly Cyclopædia*, January, 1901.

WITH MR. LOCKWOOD AT ST. BARTHOLOMEW'S HOSPITAL.

Clinical Demonstration, January 17th, 1901.

HERE is a man of about thirty-five years of age who seeks advice because of the condition of the left shoulder. Let us begin by trying to find out all we can with our eyes. There is a longitudinal scar, which begins half an inch below the tip of the coracoid process and runs down the anterior edge of the deltoid for two and a half inches. What is the most likely reason for this? It marks the position of the best incision for getting into the shoulder-joint. You can make it with the patient lying on his back, and it does not divide the main fibres of the deltoid, or the circumflex nerve and artery. Then you come down underneath the anterior edge of the deltoid; and one of the difficulties in getting into the shoulder-joint is caused by the presence of the tendon of the biceps, so that the next step is to get the biceps out of its groove. It is also difficult to get the humerus out of the socket, for one very simple reason, namely that the subscapularis holds the head of the humerus down, and until the tendon subscapularis has been divided you cannot do anything with the head of the humerus. But it is not completely free until you have divided the muscles attached to the greater tuberosity one by one.

Now can you form any opinion as to how long it may have been since that incision was made? Some of you think that it was made four to six months ago. The reason which is given for that estimate is that the scar has become a little pale. Doubtless the course of events was as follows. At the beginning of repair that incision was full of granulation tissue, and the granulation tissue was very red and vascular. Then this tissue became covered with epidermis, and began to convert itself into fibrous tissue, and gradually became paler and paler. If it had been absolutely converted into fibrous tissue (a process which takes many months) it would now be white; but it is red, and the redness is due to blood in minute vessels, for you may observe that this blood can be pressed out. There is another point to be noted about the scar, namely that there is some overgrowth, or keloid, of the scar tissue, which

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also affects the suture marks on either side. Further, this man has an opening behind, one and a half inches long, it is ragged, its edges are turned in, and it does not look as if it had been done with a knife. This opening is discharging a little blood-stained serum and it is surrounded by a little dermatitis. It is situated about the middle of the back part of the axillary border of the scapula. It looks as if the serum which exudes from it is septic. Why? Of course this is likely, because it is exposed to the air. I see you begin to test its odour, but it does not smell. Septic used to be synonymous with stinking; now it means infective whether it smells or not. The skin is inflamed, and there is an acne spot some little way off, both indicative of septic dermatitis.

The next step will be to ascertain the mobility of the shoulder. An inflamed joint is nearly always fixed. First, we notice that the patient keeps his arm close to his side. Now in asking a patient to move his arm there is a proper way of proceeding. Take, for instance, the case of a man who had been thrown out of a carriage upon his shoulder, but who had not sustained a fracture. He would be sure to have pain and an attack of synovitis in his joint. Then the time would come when he should begin to move the arm. The first movements to come back after an injury of that sort are flexion and extension, and the next movements are abduction and adduction. The last to come back is rotation. No matter what the joint is this is the order of return of movement. Therefore you first ask the patient to flex and extend the arm, and then to try and abduct it. Now this man can neither flex nor extend his arm nor get it away from his side, and therefore it is no use asking him to rotate it. If you do not understand the order in which movements come back you cannot prognose a joint injury. The other day I saw a joint case with a member of my class. The patient had been injured whilst bicycling, and had synovitis of the shoulder. But unfortunately a medical man had tried to commence the movements in the wrong order; that is to say he was trying to get rotation before extension and flexion, or abduction. So we have made out in regard to our patient that he has got immobility of the left shoulder-joint. There is, in addition, flattening of the left shoulder; all the muscles are atrophied, and so are those of the arm. You should always first of all take a broad comprehensive view of the case. If you start to read about hip disease, you will probably find that the first thing you encounter is a paragraph about "*incipient disease*" of the hip. Now patients either have or have not got disease of the hip. Then there is something about wasting of the gluteal fold. The result is that the student concentrates his mind upon that fold and does not notice the other muscles. The muscles here are probably wasted in great measure because they have not been used; you know that every time a muscle contracts its blood-supply is increased. Another reason given for the wasting is that there is tropic change through the influence of the nervous system. I do not propose to discuss this question to-day, but merely warn you against the fallacies which underlie such vague and ill-defined terms.

The routine examination of the shoulder-joint is as follows:—First of all you look at it, and your object in doing so is to see the condition of the skin; next you look at the muscles around the joint; and then you observe the bony outlines. Here you see the clavicle, acromion, the spine of the scapula, and the scapula itself. In some thin people you are able to see the tip of the coracoid. In addition you compare the outlines of the deltoids on either side, and the head of the humerus. Then make the patient move the joint, always remembering what I have told you about the order in which the movements are lost, and return. Next you begin to use your fingers, always with a definite purpose, and with infinite gentleness, lest you cause pain. The first thing you feel is the head of the clavicle, then the shaft of the clavicle, then the acromion process, and then you run the finger along the spine of the scapula, and feel the scapula itself. Fractures of the scapula are not attended by any deformity. Why is that? It is because there are muscles and fibrous bands on both sides. A fracture of the scapula may run across the body. How do you ascertain that? By putting the hand on the top of the scapula so as to fix it, and with the other hand taking hold of the lower end of the scapula, so as to move it from side to side. If there were a fracture in the middle of the body, or running through the spine of the scapula, we should detect it in that way. You probably could not diagnose fracture through the supra-spinous fossa of the

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scapula, except by photography. Now observe how to examine the coracoid process. I place the palm of the left hand on the back of the scapula, and the thumb on the coracoid; next the thumb is slipped outwards until it rests upon the greater tuberosity of the humerus, which moves with the arm; the coracoid is still. The greater tuberosity of the humerus has much the same relation to injuries and dislocations of the shoulder as the great trochanter of the femur has to injuries and dislocations of the hip.

We have now ascertained all that we can with our eyes and fingers. Let us now ask for the history of the scar. The operation appears to have been done twelve months ago, at which date we are told he had his shoulder-joint opened, and some carious bone removed. On Saturday last I gave an anæsthetic and explored the sinus behind, and found it led into the shoulder-joint. Therefore, what do you think is the condition of the shoulder-joint? You will proceed to reason in this way; it will have suffered for many months from the effects of chronic suppurative arthritis, the suppuration will have ended in the production of granulation tissue, and that will have led to the removal of the articular cartilage. This process may have been accompanied with caries or necrosis.

I shall resect the shoulder and remove all the diseased bone, for he will never have a proper shoulder so long as that bone is there. I have warned the patient that he must move his arm about afterwards, so as to get free movement and make the operation a success. I am very reluctant to do resection of the shoulder-joint, because so few patients will go through with the movements which are necessary afterwards. I do not think there is much disease of the scapula, so that the glenoid cavity will not require much treatment; but the skiagram showed an alteration in the shape of the humerus, and the whole of its head will need removal. To do this I shall get at it quite well through the anterior incision, and so far repeat the operation which has been done. There is no evidence of the joint being tuberculous, but it has gone through the stages mentioned before; it was inflamed, and became full of pus—there was suppurative arthritis—and next the cartilage became eroded. After that the cartilage became removed, and the next stage would have been destruction of the bony ends. But, most often, when all the cartilage is eaten up, or has disappeared, the ends of the bones covered with granulations are in contact with one another. The granulating surfaces adhere, and ankylosis then occurs, which may be either fibrous or bony. If you wish to get bony ankylosis you must keep the part absolutely still. If there is movement, any union which takes place is fibrous. In addition, to get bony ankylosis the surfaces must not only be kept still, but also close together. But this man requires a movable shoulder-joint. To obtain this a different plan is followed; a good deal of bone is excised, so as to have the surfaces far apart, and movement is begun as soon as the pain will allow.

[At the operation all the articular cartilages had disappeared, the head of the humerus had been partially removed, and a small sequestrum lay at the back of the glenoid cavity.]

Lime-burns of the Eye.—The first thought in the treatment of lime-burns should be directed toward the removal of the offending substance. The lids should be carefully everted, and every part of the conjunctival surface carefully cleansed with oil; but if this be not feasible, a diluted solution of vinegar should be instilled, or even an excess of water may be employed. Fuchs recommended dropping a concentrated solution of sugar into the eye after lime-burns, since cane-sugar forms an insoluble compound with lime. After the eye has been thoroughly flushed and the chemical neutralisation has been accomplished, any solid particles should be removed with a pledget of linen or with a forceps. The whole conjunctival sac should then be cleansed with some mild antiseptic, preferably boric acid (10 grains to 1 ounce), and iced compresses constantly applied until its inflammatory reaction has subsided. As the iris is likely to be involved, if the cornea be at all affected, a strong solution of atropine should be dropped into the eye to dilate the pupil. Cocaine may be employed if there be much pain, or a subcutaneous injection of $\frac{1}{4}$ grain of morphine and $\frac{1}{6}$ grain of atropine over the eyebrow will afford great relief to the patient. Subsequently, protection of the eye, with the use of olive or castor oil dropped into it, will best promote the healing process.—W. C. Posey, *Therapeutic Gazette*, December 15th, 1900.

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WITH DR. MITCHELL BRUCE IN THE WARDS OF CHARING CROSS HOSPITAL.

JANUARY 31st, 1901.

GENTLEMEN,—This is a case of chronic cardiac disease in a woman. I will ask you to simply listen to the patient's chest—that is to say, to auscultate the præcordia,—because I want you to make a diagnosis for yourselves, if you can, from that method of examination alone. From the diagnosis I think we shall be able to draw some very important conclusions. For my particular purpose this is the most profitable order in which to approach the case. There is a definite history of this patient having had three separate attacks of rheumatism, probably of considerable severity; and there is also a definite story of cardiac disease during the last few years, and of cardiac failure with dropsy for, at any rate, two years. It is two years since the abdomen was tapped and fluid removed from the peritoneal cavity. She came into the hospital three weeks ago, and prior to that she had had dropsy of the legs for a good many months; therefore there was no doubt about the general diagnosis of the case; it is one of cardiac failure, following upon old rheumatic valvular disease. I realise that this is not quite a fair way of asking you to make a diagnosis. I have not given you an opportunity of going through the proper routine form of examination, and therefore I shall not comment upon the fact if you give me a wrong diagnosis.

Now I find you all agree that there is a systolic murmur that is very plain—it is a loud basic systolic murmur. But only one or two of you thought you could detect a diastolic murmur. There can be no doubt that the loud sound we hear is a genuine aortic murmur. But our further observation is that in the ordinary aortic area a diastolic murmur was not audible. Some of you, indeed, did hear it as an indefinite creak; others did not hear it at all. The interesting point is

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that that diastolic murmur is quite audible and distinct if you go to the apex in search of it. If you go right into the mitral area you will be able to hear a well-defined diastolic murmur. That is what I may call the first lesson in the case. I do not know whether it is new to you, but I know that it would be information to some people that this sign —the evidence of one of the gravest of cardiac lesions—may be audible only in the mitral area; and therefore that, if we omit to go a sufficient distance down in the examination of the chest, we may fail to discover perhaps the most important of all of the auscultatory evidences of serious valvular disease of the heart. Now this is very important. It is not at all a new observation, but it is not often that one is able to see it so well illustrated in a particular patient. The explanation is not at all difficult. An aortic systolic murmur is conveyed from the aortic area upwards along the ascending blood into the arteries of the neck. A diastolic aortic murmur, significant of regurgitation, is audible—in some instances, at any rate—along the reflux stream of blood into the left ventricle; that is to say, towards the apex of the heart. We meet with this in all degrees. Sometimes we hear the murmur very loud in the aortic area; sometimes it is weak. Usually it is conducted along the sternum to the ensiform; sometimes in the track of the left cartilages towards the apex; and in a certain number of instances it is audible only in the mitral area.

The second lesson we learn from this case is as follows. I do not know whether any of you listened for the second sound of the heart, or whether, when you listened over the aortic area, you noticed that one can hear only the harsh systolic murmur. This, again, may appear to be a refinement of diagnosis; but let us consider exactly what it means. If there be positively no second sound, then we may assume—if we may assume anything from physical signs—that there is no tension of the aortic valves, for the second sound is produced by tightening of the aortic valves. If there be no second sound, we are justified in concluding that there is no tightening of them, that there is complete incompetence of them, and of course the prognosis of such a case is much less favourable. Now let us consider the position which we have reached. We have a very loud, coarse, systolic aortic murmur of rheumatic origin, accompanied by a thrill, and therefore suggestive of extensive coarse disease of the aortic orifice and valves obstructing the outflow of blood. Secondly, we have come to the conclusion that these valves do not close at all or tighten. Therefore I think we are safe in assuming that we have here valves which stand stiffly out, perhaps calcified by years of endocardial trouble and its effects, standing out —that is in the blood-current, and not meeting at all. But if there be all that amount of disease of the aortic valves, causing that powerful thrill and loud systolic murmur, and not meeting in diastolic time, how is it we have not a loud diastolic murmur? How is it we have a diastolic murmur which is audible only at the apex? My diagnosis is that the aortic valves, almost in apposition, leave between them a small chink, through which there escapes a fine pipe of regurgitant blood. Perhaps this might be called a refinement of diagnosis of valvular disease; but I think, if you put these points together, you will agree with me that they have some influence on the prognosis.

Now we come to another point altogether—one to which I have several times called your attention, and which I shall have occasion to refer to again upstairs. Our patient was admitted with dropsy of her legs. If you look at this chart of the urine, you will see that the patient passed only 15 oz. of urine the day she was admitted. On the second day the quantity was 10 oz.; on the third day 16 oz. Yet on the day of admission she was put on 10 minims of tincture of digitalis every four hours. So that apparently during the first three days there was no diuresis, notwithstanding the digitalis. Perhaps you are familiar with the action of digitalis, and are not surprised to hear it: but there are some who are not prepared to hear that digitalis does not produce diuresis until the fourth day of administration. Of course in private practice you do not have the same opportunity of measuring the quantity of urine, but our regular experience here is that the diuresis occurs on the fourth day after commencing the administration of digitalis. You will observe that after 15, 10, and 16 oz. of urine on the first three days, it went up to 54, 48, 68, 72, 62 oz., and so on, those numbers being recorded on consecutive days. Therefore, if you have a patient with urgent cardiac distress, you must not expect to relieve the urgent symptoms by digitalis; you must also employ ammonia, ether, or strychnia for the first day or two, to keep

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the patient going until the action of digitalis has asserted itself.

The next point of interest in connection with this case is concerned with the liver. You can feel that the liver is hard and very much enlarged, but not tender. Now we know that the tenderness of the "cardiac" liver is very considerable, and therefore this is not like a liver which is mechanically congested. In this, therefore, we have another instructive feature of the case, namely, that the liver is not only enlarged, as it is in all cases of cardiac failure, but also indurated; and from the liver alone we might learn that the cardiac failure is not of recent occurrence. In these cases, in which the liver becomes indurated after years of mechanical congestion, there is more disposition to ascites, both with respect to its existence and to its amount, than you find in recent cases of mechanical congestion, and the ascites is out of proportion to the general dropsy, and the ascites remains after the general dropsy has disappeared. Or to put it otherwise, and more usefully, you may have cases come to you as ascites with indurated liver, which have originated in cardiac disease, which are not alcoholic cirrhosis or any other cirrhosis, but an induration secondary to old-standing valvular disease of the heart.

She has no dropsy of the lower extremities, and has not had any from the fourth or fifth day after admission; the digitalis and the rest in bed have accounted for its disappearance. But you feel that the legs are slightly rough and indurated, due to the long-standing œdema. It is clear that this poor woman has been using her legs whilst suffering from chronic œdema for several months. When the legs are left with œdema in them in this way you get, not a simple serous, but a sero-fibrinous exudation into the integuments; indeed, if I were to feel these legs only, and could not see them, I should think they were scorbutic legs.

Thus we have discovered evidence in this patient's body—in her heart, liver, abdomen, and legs,—that she has a long-standing mechanical congestion and dropsy, and cardiac disease. Probably the spleen and kidneys and other organs are more or less indurated too. The question arises, what is the limit to this? Cardiac failure very often arises—perhaps always in very chronic cases—from deterioration of all the structures; there is a limit to it. Visceral deterioration so interferes with nutrition that a vicious circle is established; the blood is imperfectly formed; the heart is badly fed; and so bad goes to worse.

The next case is one of an entirely different type, namely, hæmaturia in a young man. I have two cases of hæmaturia to show you to-day, and this is the first of them. This patient was admitted with the diagnosis of doubtful renal calculus. He has practically two symptoms; first hæmaturia, and secondly an uncomfortable—perhaps, one might say, painful—sensation in the left back. Therefore the suggestion was very obvious that he has renal calculus with hæmaturia. I will not enter into the very elementary question of the diagnosis of the causes of hæmaturia; yet, as you know, hæmaturia sometimes does puzzle you very much. Let us run over this case with regard to the history very briefly, because it turns out to be quite a remarkable case from certain points of view.

The patient had his first hæmaturia about Christmas, 1899, and it lasted on until March, 1900. He was then under treatment for it, and had six weeks in bed, and it finally disappeared. From March to July, 1900, he was free from hæmaturia; but in July the hæmaturia returned, and it persisted again, under treatment, from July to November; the urine was never quite clear during all that time. The bleeding stopped in November, but only for three weeks; and from the end of November until now, the end of January, he has continued to pass blood in his urine. Again, as I have said, he has pain in the left back. But you know how readily one may be misled by pains in the back. It turns out that the pain in his left back is not in the left loin, but over the left scapular region, from about the third or fourth rib at the scapular base down to about the ninth rib, but not over the two last ribs. So that the pain is in the dorsal region of his back, and not in the lumbar region. Moreover, the pain does not pass down in the ordinary direction—downwards and forwards along the ureter. The third point is that he has never had renal colic; he has never had pain sufficient to make him sick. Now we come to the physical examination, and we find that it reveals nothing but negative facts. One cannot feel his left kidney definitely; he has no distinct tenderness over that region; but he has indefinite tenderness over various parts of the front of the abdomen, and

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if the pain is more intense in one part than in another it is over the pubes. Now he was admitted because of the possibility that he had renal calculus demanding operation, and we had to pursue the investigation. We have kept most carefully every day each individual specimen of urine that he has passed, and the nurse has made on this chart a reproduction of the colour of the urine. Here are some of the recent specimens, and you can see that they are still dark, though the tint changes from time to time. No periodicity has been noted about the hæmorrhage. Of course, the patient is kept in bed all the time. The X rays have been employed, but with negative results. There is no stone to be detected in his left kidney, though I do not say that this is a positive proof that he has not got a stone there. This is a difficult piece of radiography; but I have had stones discovered in the kidney by that means, and operations have been performed and the stones found in the places indicated. Here at Charing Cross we have the advantage of the expert knowledge of Dr. Mackenzie Davidson. With regard to the hæmaturia, what strikes us about it is that it is profuse and persistent, and if we have a profuse persistent hæmaturia lasting for months on end, varying from hour to hour, stopping and remaining absent for a time, and then coming back again, we are bound to say that these are not the ordinary characters of the hæmaturia of stone in the kidney. It suggests to me that he may have villous growth in the bladder. So we have determined to have the cystoscope used presently. The water is passed about five times in the twenty-four hours. I have seen his medical attendant, and learn from him that the patient has practically had everything tried in the way of treatment. Whilst he has been in here he has had only simple laxatives, because he is here for operation on his kidney if we are of opinion that he has got a stone, and therefore we have not interfered with the natural conditions by drug treatment.

Here is another case of hæmaturia, as you will at once see by the urine which I show you. It is not very dark, but there is definite blood in it. The patient is aged twenty, and the hæmaturia and related symptoms date from November, 1899. The first trouble of which we have any history was pain at the meatus urinarius. After the pain had lasted for a certain time he discovered one day that his urine was stained with blood; and the staining has persisted practically ever since, so that for thirteen months there has been hæmaturia. No other statement was volunteered: but on pressing him we made out that on those occasions when he had pain and there was blood in the urine, it appeared just at the end of the act of micturition. Of course the question arose in this case as in the other? What is the meaning of this? What is the pathological condition on which it depends? Again, I need not say we have run over in our minds all the ordinary causes of hæmaturia, and we have come to the conclusion that the bladder immediately behind the prostate is the seat of the trouble. It is not a case in which the kidney is affected; neither is there anything in the urine to show that it is a case of Bright's disease. Moreover, the bleeding would not last in this particular way if there were Bright's disease. There is not sufficient pain, nor pain of a particular character, to suggest stone. The diagnosis we have made is of a happily infrequent but extremely important condition of the bladder, namely tuberculosis, which is often associated with tuberculosis of the kidneys. How are we to diagnose whether it is tuberculosis of the bladder or not? You will notice he is delicate looking; there is tuberculosis in the family history; and the phenomena are suggestive of infiltration of the bladder in that part which we know to be the seat of tuberculosis, not far removed from the vesiculæ. Then we did not forget that genito-urinary tuberculosis very often affects the whole length of the tract, from the testes externally, through the cord, right up the ureters to the kidneys. We could find nothing definite by physical examination of the kidneys, and then we set to work to find out what we could about the external parts. There is atrophy of the body of the left testis. You find the epididymis with considerable difficulty, and at the very lower end of it there is a nodule about the size of a split pea. If you go a little further up and keep well back, you find a cord which reminds one more or less of a pipe stem, and is about twice the thickness of the normal vas deferens. Apparently, therefore, he has had epididymitis; he has a trace of fibrosis of the lower end of the epididymis, and there with atrophy of the body of the testis, a condition very likely which refers to the remote inflamma-

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tory process. There is no history of mumps. We have not been able to find any definite evidence of disease of the vesiculæ, but he has not been examined deliberately by the surgeon. I need hardly tell you that we have carefully searched the urine for tubercle bacillus, but we have not found it. Of course that is only a single negative result. We shall have another carefully centrifuged specimen examined shortly; and we shall also practice inoculation. It is very common to find that these patients have also pulmonary tuberculosis, but this patient appears to have no tubercle elsewhere.

I am indebted to Mr. Stanley Boyd for permission to show you my fourth case. It is that of a man who has suffered from what might have been called chronic dyspepsia for years; but dyspepsia of that type which suggests marked dilatation of the stomach. He had periodic vomiting, which occurred in the night; and the vomit fermented. After suffering for many years in this way he at last determined to have something surgical done. He was admitted here seven weeks ago, and a careful note was taken of the outline of the stomach. Then Mr. Boyd operated. He found a healed ulcer in the neighbourhood of the pylorus on the lesser curvature of the stomach. The operation performed was a gastrojejunostomy, and the result is perfectly successful. He has had no pain since, and has been able to eat anything, and he is putting on flesh rapidly. I have had several cases of this kind in which operation has been very successful. Two of the subjects were medical men, who were suffering very severely. One was very emaciated, and looked as if he had malignant disease of the abdomen; and was quite unfit for work. He had gastrojejunostomy done, and although it is five or six years ago he has never had any pain or trouble since. I see by the notes of this case that the pylorus was found to be constricted and the longitudinal fibres were markedly hypertrophied, especially in the region of the greater curvature. There were no adhesions and no large glands. With regard to pyloric troubles, I am not qualified to speak as a surgeon, but my experience would certainly be against interfering with the pylorus itself in the way of excision or dilatation. It is far better to leave the pylorus to look after itself, and to be content with short-circuiting.

THE INFECTIVE CAUSATION AND MODE OF HEALING OF EMPYEMA OF THE THORACIC CAVITY CONSIDERED IN RELATION TO PROGNOSIS AND TREATMENT.*

By BILTON POLLARD, B.S., F.R.C.S.,
Surgeon to University College Hospital.

MR. PRESIDENT AND GENTLEMEN,—When your Hon. Secretary invited me to address you at this meeting, I was beset by the difficulty of having to select a subject with which I might occupy your time acceptably. After consideration and consultation with your Secretary, it appeared to me better to choose some common ailment with which you have all had practical experience, rather than to select some more obscure subject lying on one or other of the lines along which modern surgery is progressing.

In my view the chief purpose of societies like yours is to encourage the reading of papers connected with your own work, and to stimulate amongst yourselves free discussion and criticism, which is sure to be beneficial to all concerned. I have selected the simple subject of empyema of the pleural cavity, and I propose to consider its bacterial causation and mode of healing in relation to prognosis and treatment.

Several years ago, before we had much accurate knowledge of the causation of empyema, I was forcibly impressed by the dissimilarity of a series of cases. In some, even though there was considerable pyrexia, the general condition was comparatively good, and after evacuation of the pus the patients made rapid and uninterrupted progress towards recovery. In other cases there was great prostration and evidence of intense general poisoning. Drainage of the empyema was not followed by a rapid fall of the temperature to its normal level; the patient was much pulled down by the disease, and was long in recovering his strength, and the empyema was slow in healing. I was, moreover, struck, as doubtless you have all been too, with the different characters of the pus. Sometimes it was thick and creamy, but still all liquid; at others it was thick and yellow—in fact,

* Delivered before the Wimbledon and District Medical Society.

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laudable, but it contained large masses of lymph; indeed, sometimes the masses of lymph occupied a larger bulk than the fluid pus. This occurred chiefly in cases complicating pneumonia. In other cases, notwithstanding the patient was extremely ill, the fluid evacuated from the chest was unusually watery, mere turbid serum, which one might be inclined to think hardly needed free evacuation. In some of these cases the fluid had a tinge of blood. In some cases, again, the pus was inodorous, whilst in others it was very offensive; and, indeed, occasionally had the peculiar odour of a perityphlitic abscess. The comparison of the kind of pus with the general condition of the patient, and his subsequent progress was irresistible. As a rule the offensive smell of the pus, apart from its other characteristics, had little or no influence on the subsequent progress of the case, though, in these cases, before operation there were indications, in the fever and great depression, of intense septic poisoning. When the empyema was freely drained, the discharge soon lost its smell. The cases in which there were large masses of lymph were the most favourable; those in which the pus was thick and creamy without masses of lymph usually did well; but those in which the fluid was only turbid and slightly sanious—cases, indeed, in which one rather doubted the necessity for free evacuation—did worse. The patients kept a slightly dusky tint of face, continued much prostrated, suffered from high fever, sometimes died, and if they recovered they were long in doing so, and the pleural cavity was long in closing.

The bacteriological investigations of recent years have thrown much light upon the differences just alluded to. In some cases—metapneumonic as they are called—which complicate pneumonia, and come on usually about the time of the crisis, although sometimes the pneumonia is rather latent, the chief and sometimes the only micro-organism is the pneumococcus; sometimes the pus contains staphlococci as well. In other cases staphylococci are abundant, and with them there are more or less streptococci. In others, again, the streptococci are abundant, and the staphylococci scantily present or absent. In the offensive cases organisms of putrefaction are found, and from a case under my care in University College Hospital, in which the pus had a most offensive odour, just like that of a perityphlitic abscess, an almost pure culture of the *Bacterium Coli Commune* was obtained. In other cases, again, tubercle bacilli have been found. The pneumococcus is not a very virulent organism, and it is short-lived. It is found in the most favourable cases—those which are characterised by the presence of large masses of lymph. Staphylococci are more virulent, but they do not give rise to such poisonous products as streptococci, and they are more readily got rid of by free drainage than the latter are. Staphylococci with an admixture of streptococci are found in typically purulent empyemata. Streptococci are the most virulent of all, and give rise to intensely poisonous products. They occur in variable abundance in ordinary purulent empyemata, but they are the most numerous, and possibly the only organism present, in those severe cases characterised by a turbid serous and possibly sanious exudation. The importance of this latter observation is great. No one would be in doubt as to the propriety of getting rid of laudable pus when it had been detected by exploratory aspiration; but the same need might not be so strongly suggested when the fluid drawn off was but slightly turbid. In such a case, if the patient had high fever and was seriously ill, it would be well, before deciding to postpone drainage of the empyema, to satisfy one's self that the fluid did not contain streptococci. Indeed, it may be laid down as a rule that if the fluid, serous though it be, contains streptococci, an empyema exists. By the naked-eye appearances of the fluid withdrawn from an empyema, but particularly by a bacteriological examination, we have a fairly safe guide to prognosis both as regards the seriousness to life of a given empyema, and as regards the relative rapidity with which, other intra-thoracic conditions being equal, healing may be expected to take place in different types of empyemata. For instance, in infancy and childhood empyemata generally heal rapidly and completely. For this there are more reasons than one, but at least one reason may be mentioned now. It is that the empyemata of childhood are generally due to pneumococcal infection, which we have seen is the most benign. They have an acute onset as a rule, and to the early symptoms and signs of pneumonia there are soon added those of fluid in the chest. In adults the prognosis is not so good as in children, and for this,

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amongst other reasons, one is that they are much more frequently due to the staphylococcal, streptococcal, or tuberculous infection. Staphylococcal empyemata generally begin in an insidious manner, and they run a much less acute course than the pneumococcal empyemata. Streptococcal infecfection is characterised by a rapid onset, an acute course, and by the signs of intense general poisoning.

I will now consider some of the conditions necessary for the healing of an empyema, and review shortly some of the methods of treatment. In a case of empyema the lung is compressed and collapsed proportionately to the amount of fluid in the pleural cavity. If the fluid were drawn off by the aspirator the normal condition of negative pressure would be re-established in the pleural cavity, and, if the lung were not bound down by adhesions, it would be possible to withdraw the whole of the pus, and the lung would expand and fill the space. Supposing, then, that the visceral and parietal layers of the pleura remained in contact for a sufficient length of time, adhesion would take place between the serous surfaces, the pleural cavity would be obliterated, and the empyema would be cured. If this could always be relied upon to occur, the treatment of empyema would be delightfully simple. But I have made two suppositions—first, that the lung is not bound down by adhesions, and is capable of complete expansion; and second, that the pleural surfaces remain in contact sufficiently long for adhesion to take place. Now it is just because these two conditions do not always obtain that simple aspiration, which sometimes succeeds, more commonly fails. The degree to which the lung can expand is inversely proportionate to the amount of compression to which it has been subjected, and to the time during which that compression has lasted. If the lung has been compressed for a long time, supposing the infective cause to be a mild one—such, for instance, as pneumococci, with possibly a few staphylococci,—it may become adherent in its collapsed state to the parts in contact with it, and the non-adherent part of the lung may be so small that, even with the help of the falling in of the boundaries of the chest, it is quite incapable of expanding sufficiently to fill the pleura. But supposing the lung to be capable of this expansion, adhesion of the pleural surfaces can only take place when they remain in contact long enough. If the pleura is the seat of a virulent affection, the two surfaces will soon be separated by pus, and adhesion cannot then occur. If, however, the empyema were metapneumonic, and dependent on pneumococci, recovery might follow one or more aspirations; for it has been already pointed out that pneumococci are short-lived organisms, and but slightly pyogenic. But even in a metapneumonic case staphylococci are generally associated in less or greater abundance with the pneumococci, and when so associated continuance of suppuration would be likely to occur. We may, therefore, I think, conclude that although, owing to a fortunate concurrence of conditions, aspiration may cure an empyema, it is far more likely to fail; and that, if it fails, the delay will not only have been harmful on general grounds, but also on local; for it has already been insisted upon, that the longer any part of a collapsed lung remains in contact with the parietal pleura, the more is it likely to become adherent, and unable to expand, should other methods of treatment be required.

It follows, from what has been already stated, that the two conditions required for rapid healing of an empyema are the maintenance of negative pressure in the pleural cavity, and at the same time the continuous drainage of it. The ingenious method devised by Bülau is intended to secure the concurrence of these two conditions. The pleural cavity is tapped with a large trocar and cannula; the trocar is withdrawn, and at once, while the pus is flowing in a full stream, a rubber tube is passed through the cannula into the pleural cavity. The cannula is then withdrawn, and the tube is connected by means of a piece of glass tubing with another rubber tube of considerable length, and is made to discharge into an antiseptic liquid. There is now a syphon-drain connected with the pleural cavity. So long as the apparatus remains in proper working action the pleural cavity should be continuously drained, and no air should enter it. But theoretically perfect as this plan may seem to be, and successful as it has been in some cases, it is open to several objections. As is the case with all complicated apparatus, this one is liable to get out of order. The tube may get kinked or blocked with a piece of lymph, and then pus accumulates. Without constant supervision this is likely to occur, and the measures necessary to

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clear the tube are very trying to the patient, particularly if they are frequently required. With a view to shortening the period during which syphon-drainage is necessary, it has been suggested to wash out the pleura with antiseptic fluids. But apart from the risks of irrigating the pleural cavity, the plan fails in its prime object, that of sterilising the pleura. Lotions of sufficient strength cannot be used, and even if they could they would only reach the micro-organisms contained in the pus and on the surface of the pleura, and would fail to reach those in the tissues of the pleura itself. Thus there are two conditions opposed to the success of the syphon-drainage method—the presence of masses of lymph calculated to block the tube, and the presence of micro-organisms capable of inducing somewhat prolonged suppuration. The metapneumonic empyemata, since they are dependent on organisms which are quickly destroyed by drainage, would on that ground be the most suitable ones for the syphon-drainage treatment; but, on the other hand, they are characterised by the presence of large masses of lymph, which are calculated to block the tube and interfere with the continuous and complete drainage upon which the whole theory of the excellence of the syphon-drainage plan depends.

We may therefore conclude that, although mere aspiration, or the more complicated method just considered, may lead to the cure of the empyema in a few cases, they are both very likely to fail, and that, if they fail, the employment of them will have been harmful by causing delay in the adoption of other methods, and giving time for the lung to become adherent to the chest wall in a state of incomplete expansion.

The only cases in which repeated aspiration might be employed would be those, generally met with in children, in which the suppuration is due to infection with pneumococci alone, or in combination with but few staphylococci. There is no doubt that when the pus or even serous exudations contain streptococci or putrefactive organisms, free drainage is essential for cure.

But in my opinion the best method of treatment for all cases, is that in which a free opening is made into the chest, and continuous drainage is insured by means of a large tube. But as a means of temporarily relieving urgent symptoms aspiration is of the greatest service, and in cases in which respiration is much embarrassed, it is a good plan to remove some of the pus by aspiration a few hours before the chest is freely opened. In this way the patient is placed in a better position to bear the severer operation.

In order to determine the best place to make the opening and other matters calculated to aid its success, I propose to consider the methods of healing of the cavity when the latter has been freely opened to the air. After the pus is evacuated air takes its place, and the pressure of the latter both inside and outside the lung is equalised. In a complete empyema the lung is collapsed and only a small portion of its surface lies in contact with the parietal pleura. When the empyema has healed, the lung has expanded and come into contact with the chest wall. Now how is this expansion of the lung brought about? Those who adopt the views of Roser believe that the expansion of the lung is brought about by granulation and cicatrisation commencing in the angles where the collapsed lung and the parietal pleura are in contact, and extending gradually over the whole surface as portion after portion of the lung becomes adherent. Now to my mind this explanation is most difficult to credit. It assumes that the lung must have become adherent to the parietal pleura whilst it is collapsed. If the lung were to become adherent to the chest wall in this condition it is, I think, impossible to believe that the non-adherent portion could expand sufficiently, or that the ribs could fall in sufficiently to obliterate the pleural cavity. Indeed, experience shows that cases in which the lung has been collapsed for a long time, and has become adherent to the chest wall in that condition, are just the ones in which the lung does not expand, and for the cure of which extensive resections of the bony wall of the thorax are practised. Again, it is a common experience that in recent cases of complete empyema, which have been thoroughly and continuously drained, healing may take place in three weeks, and in children sometimes in even a shorter time than that. Granulation is a slow process, and in other regions of the body very much smaller cavities require a very much longer time to heal.

Weissgerber advanced the view that it was not by a process of granulation, but by direct adhesion of the visceral and parietal layers of the pleura that the cavity of the empyema was obliterated

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and this is the view which I adopt. Adhesion of the two layers of the pleura can obviously only take place when the lung has expanded sufficiently to remain in contact with the parietal pleura. It has been said that when the pleural cavity has been opened the pressure of air must be equal, both inside the lung and on its surface, and that the only force which can bring about the expansion of the lung is the force of cicatrisation. A little consideration will show the fallacy of this position. Everyone must have noticed in making a digital examination of the pleural cavity after opening an empyema, that at first the lung is collapsed, and possibly only just within reach of the finger. Perhaps after making this observation the patient happens to come out of the anæsthesia sufficiently to cough. Now what happens? If the finger is in the pleural cavity at the time, it will feel the lung expand and in many cases come into contact with the chest wall. The explanation of this is obvious. The ribs fall together and the arch of the diaphragm rises during the violent expiratory effort. By this means the size of the pleural cavity is diminished; but that is not all. The collapsed lung is itself inflated. During the cough the glottis is closed and is not at once forced open by the air which the expiratory effort drives from the healthy lung, for there is a free vent for it from the opposite bronchus into the collapsed lung. The glottis being opened, air is drawn in from outside, and subsequent coughs drive more and more of it into the collapsed lung and expand it. Supposing now that the anæsthesia is deepened, the lung shrinks somewhat, but does not collapse to anything like its previous state. It is, of course, well known that it is well-nigh impossible to squeeze the air out of a lung post mortem, and in the condition of things we are contemplating the only force which can act upon the lung is its own elasticity. But there is, I think, during life, another condition which assists to maintain the expansion of the lung. I refer to the blood-pressure. Surely this, acting on the innumerable capillaries of the air-cells, would produce a condition which I would liken to a number of springs, which would together exert a considerable force on the side of expansion. But even if my argument be freely admitted so far, there still remains something to be explained. After the cessation of coughing, although the lung does remain fairly expanded, it nevertheless shrinks sufficiently to leave an interval between it and the parietal pleura, and rapid healing by adhesion between the two pleural surfaces must require actual contact. A simple experiment which I have often made will lead us a step further. After an empyema has been freely opened air passes in and out of the cavity readily during inspiration and expiration. If whilst the opening is uncovered the chest be auscultated, little or nothing can be heard of the breath-sounds. But if a dressing be applied and the chest be again auscultated after a few minutes intervals, the breath-sounds will be more audible, and, if the patients coughs a few times, they may often be heard quite distinctly. Now what is the explanation of this? As long as the air can enter the pleural cavity freely, the enlargement of the thorax during inspiration exerts no influence on the lung. When the opening is closed by a dressing the entry of air is more difficult, and then the expansion of the chest acts upon the lung and air is drawn in through the bronchus, and audible breath-sounds are produced. After a time, too, the meshes of the deep dressing become filled with purulent discharge, and then the dressing acts as a sort of valve. During inspiration it offers considerable resistance to the entry of air into the pleural cavity. During expiration, and particularly during the expiratory effort of coughing, air is expelled from the chest and escapes beneath the edges of the dressing.

Owing to the coughing the lung is now blown out sufficiently to come into contact with the parietal pleura over a considerable area, and a sort of sucker-action is established. Just as a piece of wet leather tightly pressed against a stone cannot be separated without considerable force, so the lung remains in contact with the chest wall. That this sucker-action can actually take place is established by what we know of cases of surgical emphysema complicating broken ribs. Surgical emphysema may be present without pneumothorax, even when the lung is not adherent opposite the broken rib.

In the case of empyema which we have been considering, coughing has forced the lung into contact with the chest wall after driving the air out of the pleural cavity. During inspiration the more or less impervious valve formed by the deep

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dressing saturated with pus would offer considerable obstruction to the entry of air into the pleural cavity, and so the enlargement of the thorax would draw air into the lung through the bronchus, and give rise to the breath-sounds which are audible under the conditions under consideration, when the lung is not bound down by adhesions.

Assuming that the views I have put before you are correct, let us consider what we can deduce from them in regard to treatment and prognosis. It is important, in order that the drainage may be free and continuous, that the opening should be big enough to admit a large drainage-tube, and of such a nature that the lumen of the tube may not be compressed by its borders. With this object it is my custom to excise a piece of rib in all cases. The removal of a piece of rib adds very little to the duration of the operation, nothing to the shock of it, and, so far as I have seen, it entails no additional risk of any kind. I am well aware that plenty of cases have recovered perfectly without having a piece of rib excised, but in a good many the ribs have fallen together and compressed the tube, and so interfered with the perfect drainage, which is essential for healing. The situation of the opening is important. It should be so placed that it will be dependent when the patient is lying on his back, so that the discharge will readily escape in the early stages of the treatment, when the recumbent position is usual. It should also be placed low enough to drain the whole of the cavity likely to be left at the time the patient begins to sit up in a case which has not healed rapidly. I believe these conditions are best met by making the opening about an inch below and outside the inferior angle of the scapula, and opposite the eighth or ninth rib. This situation is preferable to the more customary axillary site. It affords the most perfect drainage. It is quite true that the majority of cases treated by an axillary opening do perfectly well, but occasionally the drainage by this route is so inadequate that it is necessary to make a counter-opening behind. It may be thought that if perfect drainage is so important it would be best to open the empyema at the lowest point of the pleural space. There are good reasons for not doing so. The opening at the spot indicated is about the lowest part of the pleural cavity as the patient lies in the supine position, and soon it becomes the lowest part in the erect position. Unless the lung can expand well, and fill the pleural cavity, the size of the latter is diminished as much as possible by the falling in of its boundaries, and nowhere does this occur so much as at its base. The arch of the diaphragm rises and comes into contact with the lower part of the chest wall. Adhesion takes place, and the pleural cavity below the spot indicated for the opening is obliterated. If the opening is made at the lowest part of the pleura, it will soon happen that the tube must traverse a long sinus between the diaphragm and the chest wall in order to tap the unobliterated space above. If the tube be a short one, or if it has been injudiciously shortened, it may not reach this space, and whilst the surgeon is congratulating himself on the cessation of discharge, pus may be accumulating about the upper limit of the adhesions. I have several times known it necessary to open the chest at a higher level, in order to give vent to pent-up discharge, when the original opening had been made too low. After the chest has been freely opened the pus escaped readily enough. In those cases in which the pleura is coated with lymph, and in which large masses of it are contained in the pus, special care should be taken to remove it. If left behind it may be injurious in two ways. It may block the tube, and interfere with the perfect drainage which is so essential for rapid expansion and adhesion of the lung. Its removal is sometimes looked upon as unimportant. It is said that it will become liquefied, and escape spontaneously. Whether this is so or not I cannot say, but I know that it may resist liquefaction long enough to do harm by impeding drainage, and so giving more time for the lung to contract adhesions to the chest wall in its collapsed state. My custom is to rub off the lymph with a mop of wool on a holder, and if it is not quickly expelled by coughing, to remove it with forceps or scoop. Beyond its likelihood of interfering with drainage there is another reason for the removal of the lymph. It does not form an even layer, and it presents an irregular surface, which would interfere with the sucker-action, which is an important factor in bringing about rapid adhesion between the visceral and parietal pleuræ. At this stage of the treatment another point requires consideration in cases of fœtid empyemata. Should the

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pleural cavity be washed out? I think that in the majority of cases it is unnecessary to do so, and that in some the operation of irrigation may be attended with danger. As a rule, if the empyema is adequately drained the discharge soon ceases to smell. I have known many cases of very putrid empyemata which have taken a typically favourable course. This was so in a case already referred to, in which the pus was very offensive, and from which an almost pure culture of *Bacterium Coli Commune* was obtained. That irrigation of the pleural cavity is a risky procedure is attested by the occurrence of several deaths during the operation. One of these occurred in my own practice several years ago. The discharge was very foul. The cavity had been scrubbed out with a sponge with impunity, but almost directly the irrigation was commenced the patient collapsed and died. There was such a free opening into the chest that the return flow of the lotion met with no impediment, and the lotion, which was discharged under a pressure of about two feet of water, had a temperature of 100 F. I must admit that I have irrigated the pleural cavity on many occasions without any untoward result, but the case just referred to has led me to restrict it to cases in which, notwithstanding free drainage, the pus remains putrid, and the temperature continues high. But even then I do not think irrigation the best way of cleansing the pleural cavity. In children particularly it is my custom, when possible, to give a boracic acid bath at a temperature of 100 F. During respiration the lotion flows in and out of the chest, and cleanses it in a most effectual manner.

Now let us consider what we can learn in the direction of prognosis and treatment from the state of the lung. I have already stated that if the lung is not bound down by adhesions, vigorous coughing will expand it. In order to test this matter it is my habit to let the patient come slightly out of the influence of the anæsthetic, if a paroxysm of coughing has not been already induced. If the lung expands well during coughing, it is justifiable to conclude that the empyema will heal satisfactorily if the general condition of the patient is not inconsistent with recovery. If, on the other hand, the lung does not expand satisfactorily under the influence of coughing, the prognosis as regards ultimate healing is worse, and varies inversely with the degree to which the lung expands. This is a most important point, and should be borne continually in mind in the early stages of a case in which there is any possibility of an empyema forming. The empyema must be diagnosed at the earliest possible moment, in order that the fluid may be evacuated as soon as possible. In every case of pleuritic effusion which is long in being absorbed, and more especially if the temperature is unduly raised, some of the fluid should be removed with a sterile aspirator, and a culture should be taken from the fluid removed. If it proves to be sterile, no harm will have been done, but rather good. The compressed lung will be allowed to expand, and the absorption of the remainder of the fluid is likely to be hastened. If, on the other hand, the culture shows the pleural effusion to contain micro-organisms, further exploration should be made on succeeding days, as the probability that the effusion will become purulent is very great. If the culture shows the presence of streptococci, even though the fluid is but slightly turbid, a free opening into the pleural cavity is imperatively required. Again, in cases of pneumonia it is necessary to be on the watch for complicating empyema. It is well known that the physical signs of an empyema may so closely resemble those of pneumonia as to make a decision on them alone impossible. In any case in which convalescence from pneumonia is unduly delayed, and in which the physical signs do not clear up as they should, the presence of an empyema should be suspected, and the dull area should be explored for pus. I am convinced that the chief causes of persistent pleural sinuses after the drainage of empyemata are the presence of adhesions between the collapsed lung and the chest wall at the time of the operation, and the presence of an organising layer of lymph on the surface of the lung itself; that both of these conditions tend to bind down the lung in its collapsed state; and that the establishment of these conditions proceeds in direct proportion to the time the empyema has existed undrained.

Returning now to a particular case of empyema in which it is found that considerable expansion of the lung does not occur readily; what is to be done? In such a case the closure of the cavity of the empyema, if it occurs at all, will be largely brought about by the ascent of the diaphragm, by

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the falling in of the chest wall, and by the encroachment of the contents of the opposite side of the chest. But even these aids will be inadequate if the lung is permitted to get fixed to the back of the thorax in a collapsed state, and if the lymph on its surface is allowed to become organised into a non-distensile layer whilst the lung is still collapsed. To minimise the effect of these injurious conditions there are three clear indications for treatment. To break down as far as possible the adhesions between the lung and the chest wall; to rub off the lymph from the surface of the lung; and to use some means for distending the lung, and so to break down or stretch loose the adhesions. The only way in which the lung can be expanded is by raising the pressure of air within it beyond that of the atmosphere which is exerted through the sinus in the chest on its outer surface. This might be done by letting the patient breathe compressed air several times a day. But if it is not possible to provide the necessary apparatus, the principle underlying such treatment can be utilised by very simple means. The healthy lung is quite capable of raising the pressure of the air in the collapsed lung to the requisite degree, if an obstruction to the exit of air from the mouth is interposed. It has already been pointed out that coughing is admirably adapted to the purpose in view. This does well enough for adults, but it is difficult to get children to cough much. For children who are old enough and for adults a good plan is to get them to distend strong rubber balls by blowing into them. During each expiratory effort the pressure of the air in the collapsed lung will be raised to a similar degree to that in the rubber ball. In this way the lung will be prevented as much as possible from being tied down by adhesions, and, when the chest has fallen in as much as it can, it may be that the lung will have been kept sufficiently distensible that it can fill the remainder of the space.

In this paper I have in the main dealt with cases in which the empyema is general. Cases in which the empyema is localised should be treated on similar lines, the opening being, of course, made over the dull area.

There are several other points connected with the prognosis and treatment of empyemata which might be considered, but I can now only touch shortly on double empyema and tuberculous empyema. The prognosis in a case of double empyema is obviously worse than in single empyema, but cases in which recovery has followed free and simultaneous drainage of both pleuræ have been recorded by several surgeons, and two such cases have occurred in my own practice. At first thought it might appear that such cases must of necessity be fatal, and that free opening of both sides of the chest must necessarily put an end to respiration. But this is by no means the case, provided the entry of air into the pleural cavity meets with more obstruction than does the entry of air into the lungs by the respiratory passages. A case which was under my care at University College Hospital a few years ago illustrates my point well. A little boy fell from a third-story window, and alighted on the area palings in such a way that he sustained a large penetrating wound of each thoracic cavity. He was lifted off the spikes and carried to the hospital. Air was rushing in and out of the pleuræ, but still the boy managed to breathe. The clothes were removed, and each wound was covered with a dressing. He then breathed better. Fully three quarters of an hour elapsed before I saw the patient. The boy had considerable dyspnœa, but still he managed to draw sufficient air into his lungs, doubtless because the resistance to its entry that way was rather less than through the thoracic wounds, covered as they were in the first instance by clothes, and then by dressings. First one wound and then the other was disinfected and closed, and the child made a rapid and complete recovery. But in a case of double empyema there is still less reason to fear opening both sides of the chest. The very fact that a patient with a double empyema is alive seems to show that one or other empyema is incomplete, for if both lungs were compressed he could not breathe at all. Moreover, it follows from what I have, I think, shown in this paper with regard to the expansion of the lung after evacuation of an empyema, that when the pus is evacuated and the wounds dressed, the lungs would expand, and more breathing space would be obtained. One of my patients was a little girl aged five and a half years. Her illness began with pneumonia rather more than a month before operation. Each pleural cavity contained masses of lymph and about five ounces of pus. After one side had been opened a

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pad of gauze was held against the wound whilst the other side was being dealt with. The upper part of each lung was adherent. Respiration was relieved rather than distressed by the operation. The temperature, which before the operation used to go up to 103° F. at night, fell at once, and after the second day it kept below 100° F. Both tubes were removed by the tenth day after the operation, and both wounds were healed in another month.

With regard to tuberculous empyemas, it is, in the first place, no easy matter to be certain of their nature, and in the second to decide on the course of treatment which should be employed. Many cases of serous effusion are thought to be tuberculous, and in some the tuberculous nature has been determined by bacteriological investigation; but with these I am not concerned. If the ordinary bacteriological examination of the puriform fluid removed from the pleura gives a negative result, the tuberculous nature of the empyema should be suspected, and a special examination to determine the point should be made. But the presence of staphylococci and streptococci does not disprove the tuberculous nature of an empyema, and if the patient's medical history is suggestive of tubercle, and particularly if there are signs of it in the lung, the empyema fluid should be examined for tubercle bacilli before it is decided to drain the chest. Tuberculous empyemata, when opened frequently, fail to heal, and then in the course of months the open pleural cavity is, notwithstanding great care, almost certain to become septic. The patient will then very probably suffer from hectic fever and its consequences. It is thought, too, that there are grounds for believing that after free drainage of a tuberculous empyema the pulmonary disease will make more rapid progress. It is, therefore, generally better in simple tuberculous empyemas to remove some of the fluid from time to time by aspiration rather than to open the chest and drain it freely. If, however, the patient suffers from much fever, and if in the puriform fluid removed by aspiration staphylococci and streptococci are present in abundance, or if the fluid has got infected with saprogenic organisms, and has undergone decomposition, the lesser of the two evils would be to drain the empyema. The prognosis would be a bad one, for very probably the empyema would never heal.

TREATMENT AFTER ABDOMINAL OPERATIONS.

A Post-Graduate Lecture delivered at the West London Hospital,

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GENTLEMEN,—The first point of importance in the treatment after abdominal operations is the dressing. I do not propose to discuss the various forms of antiseptic dressing; suffice it to say that it is necessary to apply a dressing which is sterile, absorbent, non-irritative, and impregnated with some chemical which prevents the growth of micro-organisms. I think that Lister's double cyanide gauze answers these requirements. As supplied from the manufacturer, however, it may not be sterile, and so it is advisable to keep it damped with 1 in 20 carbolic lotion; this also has the advantage of removing any free sublimate which may be in the dressing, and which, if allowed to remain, might cause irritation of the skin. In abdominal surgery I always fix the dressing next to the wound by means of collodion in order not only to avoid the necessity of bandaging tightly the chest and the upper part of the abdomen, but also to diminish the amount of dressings necessary. Without its use, too, the wound may become infected by micro-organisms which have crept under the margins of the dressings. After the edges of the wound have been accurately adapted with sutures, the surrounding part is finally cleansed with 1 in 1000 perchloride solution, and a strip of gauze of six or eight thicknesses and about one inch wide is wrung out in 1 in 40 carbolic, and applied to the wound; the surrounding skin is then carefully dried with dry cyanide gauze, and a piece of dry gauze, of one thickness only, and about three inches wider than the moist dressing, is put over the wound and surrounding skin. This is fixed to the skin by brushing on collodion, which is dried by fanning. Ordinary collodion is far preferable to the flexible variety; it dries more quickly, and is less liable to become loosened. When the collodion is dry, several thicknesses of dry gauze are placed over the wound, and an area some distance from it, and over this some ordinary absorbent wool is applied.

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The dressing is kept in place by a many-tailed bandage, which should be made not of one piece of flannel with its sides torn into horizontal strips, but of six or eight strips of flannel each three inches wide, and sewn together at the back in such a way that each strip overlaps the other for one half its width. It should also be made to fit, care being taken that the tails are neither too long nor too short; the simplest way to gauge the necessary length of the tails is to measure round the most prominent part of the abdomen, and to make the tails twelve to eighteen inches longer than the girth. It should also be made the right size from above downwards; the first tail should encircle the pelvis, and the last tail the chest. The best materials for it are either ordinary flannel, or a very thin variety known as nun's veiling. The ordinary flannel is the best in the winter, and the nun's veiling is certainly more comfortable in hot weather. There is no objection to the many-tailed bandage being loosened and the cotton wool re-adjusted, to make the patient more comfortable, even on the day after the operation, since the fixing of the dressing with collodion prevents any risk of the wound being infected during the process. The dressing next the wound is left undisturbed for ten days, when it is removed, and the stitches are taken out; a similar dressing is then reapplied for another week.

The next point is the management of the patient after the anæsthetic, particularly with a view to diminish shock, and to prevent, as far as possible, the very awkward sequelæ of persistent post-anæsthetic sickness, a complication fraught with especial risk in stomach surgery.

In the first place, care should be taken in moving the patient back into bed; three people, all on one side, should lift the patient, one placing his arm under the thighs and buttocks, the second his arms under the back and shoulders, and the third supporting the head and looking after the arm opposite the lifters, so that it is not bent under the body. The bed should, if possible, be placed at right angles to, and close to the table, so as to diminish the distance over which the patient has to be carried. The patient should be carried perfectly horizontally, or with the head at a slightly lower level than the feet; he should be slowly and carefully lowered on to the bed, and when this is entrusted to porters, care must be taken that the patient is never moved roughly, nor thrown down on the bed.

For use immediately after the operation, the bed should be made up with a low pillow or bolster, and the mattress should be covered first with a clean under-blanket, and then with a sheet and draw-sheet; mackintosh under the sheet is not required, since it makes the bed less comfortable. Two good-sized pillows are placed under the patient's knees, and the patient is covered with a blanket; over this a large cradle is placed to keep off the weight of the bed-clothes from the abdomen, and then the ordinary bed-coverings are put on. The whole bed should be thoroughly warmed by a warming-pan, or, if this is not obtainable, by several hot-water bottles inside at the commencement of the operation. Several fresh hot-water bottles also must be in readiness at the end of the operation, so that they can be placed at the patient's feet, and also at the side of his legs and body if any shock is present. These bottles must be covered with flannel, and placed outside the blanket covering the patient, and even then care must be taken that any part of the limb does not remain in contact with them for any length of time, since burns very readily occur on the legs if hot-water bottles are allowed to touch these parts during recovery from anæsthesia. I have seen several cases where large portions of the skin of the legs sloughed, which necessitated many weary weeks of confinement to bed after the patient had completely recovered from the operation.

The patient must lie on his back, with the head low and turned to one side, so as to facilitate the escape of vomit; he must not be left alone under any circumstances, since, in the nurse's absence, he might become choked by vomit, or might suffer from sudden syncope from an attempt to sit up while semi-conscious. To prevent shock, the patient should have the clothing removed if wet, and another dry, warmed, flannel jacket applied; this can be done without causing any disturbance, but nothing of the nature of a vest should be put on till the patient has regained consciousness; after severe operation the feet of the bed should be raised about six inches, so as to encourage the flow of blood to the brain. The patient should be rubbed down with a warm towel to remove the sweat, and also to encourage the circulation. The

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room should be warm, either 65° or 70° F., and no window should be allowed to be open.

As has been already stated, anæsthetic vomiting is particularly annoying in stomach surgery, since not only is a strain put upon the stitches, but the already half-starved patient is prevented from taking food. One method of preventing vomiting which seems to have a good result is as follows:—Immediately after the inhalation of chloroform is discontinued the patient is made to inhale about a drachm of vinegar from a towel. This very frequently has the effect of making the patient sick at the time, but I have certainly found that a considerable number of patients are free from vomiting afterwards; I therefore think the method worthy of trial.

Nothing should be given by the mouth for four or five hours after the operation, but the patient should be allowed to rinse his mouth out with hot water at intervals.

According to Shuter the duration and severity of the vomiting is influenced by the nature of the anæsthetic; thus, although vomiting is constant after ether, the most prolonged cases usually follow chloroform. He notes, too, that the worst cases are in the prime of life, while old people often escape altogether, and children suffer slightly. Anæmic people suffer badly, and alcoholics slightly.

Various drugs have been recommended to prevent or control vomiting, but there is none which will act with certainty. Spencer gives his patients morphine and atropine every three hours to prevent vomiting, but other surgeons find that these drugs have the contrary effect; cerium oxalate, bromidia, and small doses of hydrocyanic acid or of tinct. iodine have also been tried. Strong black coffee is very refreshing, and acts well in some cases. Ice by the mouth is of very little if of any value, and has a bad influence in needlessly abstracting heat from the body. When vomiting continues for more than twelve hours some other means will have to be employed. One of the best is to give the patient half a pint of hot water, either plain, or with from fifteen to twenty grains of bicarbonate of soda. This often has the effect of making the patient sick, but at the same time enables him to bring up the mucus which is secreted by the irritated stomach. On the other hand, the hot water may not be returned, but may pass onward, and no more vomiting will occur. Strychnine, either by the mouth or hypodermically, is sometimes effective. In persistent vomiting also the bowels must be thoroughly cleared out. When, however, vomiting continues for two or three days, and the tongue becomes dry, more energetic treatment is indicated, and a soft stomach-tube should be passed and the stomach washed out with several pints of boiled water, so as to remove all decomposing material. This must be repeated if necessary.

The position of the patient, too, after stomach operations has some influence on vomiting; thus, after the first few hours the patient should be propped up in bed with one or two pillows, and may also be turned on to the right side, so as to encourage the passage of fluids through the new pylorus.

There is a form of vomiting after gastro-enterostomy which demands special attention. This is the persistent vomiting of large quantities of bile, which continues for a long time, and leads to extreme emaciation. It is usually due to a vicious circle being set up, whereby the bile enters into the stomach by the new opening instead of passing on to the jejunum. It is usually accompanied by obstruction to the outflow of stomach contents, and can be prevented by adjusting the intestine carefully so as to avoid subsequent kinking; if, however, it arise, it is an indication for further operation. The abdomen should be re-opened, and a lateral anastomosis performed between the two loops of intestine going to the gastro-enterostomy. This has been followed by success in several cases. Thus Ricard records a case where he did this anastomosis twenty-two days after the first operation, and cured his patient.

Shock.—We have already referred in the treatment before operation to the methods which should be employed to prevent *shock;* and in this condition prevention is better than cure. When severe shock is present, the anæsthetic had better be diminished, and the patient kept scarcely under its influence. It may be better also, after the operation, to leave the patient for a time on the operating table with the feet raised, before removing him to bed, this is specially indicated if the table is heated by hot water. If chloroform has been used as an anæsthetic, thirty minims of ether

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may be injected with a hypodermic syringe, but the needle must be plunged into a muscle, since, if injected under the skin, not only is the absorption slower, but a considerable amount of skin round the puncture may slough. Brandy also and caffeine may be injected hypodermically. Tincture of musk is also used as a hypodermic injection, but care must be taken that it is fresh, since it rapidly develops micro-organisms. One of the most powerful methods of diminishing shock is by the injection of about a pint of warm water, at a temperature of 110° F., into the rectum; this should be done slowly, in order to ensure retention, and before the patient is removed from the table. When the shock continues this may be repeated as often as every hour. Some surgeons prefer to use normal saline solution instead of plain hot water, but it does not appear to have any particular advantage. Half an ounce of brandy may be added to the enema. The next method of treating shock is by the subcutaneous or intra-venous injection of normal saline solution. The subcutaneous method is very popular in France, and it is usual to inject two to four pints of saline solution subcutaneously during the first twenty-four hours. In some ways the subcutaneous method is preferable to the intra-venous, since it does not cause such a rapid dilution of the blood, an effect which may produce imperfect aëration and consequent dyspnœa. It has the disadvantage of being rather painful. The improvement caused by intra-venous injection is often very transient, and a second injection has to be made, while sometimes a third or a fourth is necessary. Care must be taken in these injections to keep up the temperature of the saline solution to 105° F. Intra-venous injection should be made into the median basilic vein; the fluid is introduced by means of a funnel attached by rubber tubing to a cannula. The funnel should be held about three or four feet above the arm, and the fluid allowed to run in slowly. In the case of subcutaneous injection a syringe must be used, and the fluid forced by its means into the subcutaneous tissue, that of the axilla being best adapted for the procedure. Great care must be taken to sterilise the saline solution; it should be boiled and allowed to cool, and placed in a clean receptacle and covered with cotton wool or a sterilised towel.

Hypodermic injection of strychnine and of digitalin may also be employed, the former being one of the most powerful stimulants at our disposal, a thirtieth of a grain should be injected, followed by a sixtieth in an hour's time. Not more than three or four doses should be given until after a certain interval. I usually order a fiftieth of a grain of strychnine to be given every four hours during the night after the operation. Digitalin is also of use, but has the property of lowering the temperature, it is, therefore, not so valuable as strychnine. According to some surgeons morphia has the power of diminishing shock, since it relieves pain, and pain by itself may be a cause of shock.

(To be continued.)

THE treatment of serious cases of anæmia is always a process which occupies a certain amount of time, and is generally a tedious matter for both patient and doctor, one of the chief reasons being that the main element in the successful treatment of these cases is difficult to secure, because there are only a few people able to afford the necessary time and money. In the book published by the Bovinine Company of clinical reports compiled from private and hospital practice on the use of Bovinine in medicine and surgery, there are some cases quoted which certainly indicate that in this therapeutic agent we have secured the means of satisfactorily and efficiently dealing with the anæmias. Not only is this product an excellent remedy for the chlorotic and weakly, but in cases of tuberculous lung disease its usefulness in prolonging life is especially clearly shown. As is well known, Bovinine is a beef juice prepared by a cold process, and there is no doubt that it can be scientifically and accurately stated in regard to this unique preparation that by its exhibition, whether topically, for rectal feeding, or subcutaneously, uniformly good results are obtained. The little volume issued by the Company concerned in this product forms most interesting and instructive reading. A large number of the cases reported are from the Bellevue Hospital, East 26th Street, New York, and this fact affords a reliable index to the value of the testimony put forward. Bellevue Hospital was founded in 1812, and contains 966 beds, entailing a yearly expenditure of over three hundred thousand dollars.

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* *Specially reported for the Clinical Journal. Revised by the Author.*

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REMARKS

ON A

CASE OF CHRONIC INTERSTITIAL NEPHRITIS IN A GIRL AGED SEVEN YEARS.*

By LEONARD GUTHRIE, M.D., F.R.C.P.,

Physician, Children's Hospital, Paddington Green, and to the Hospital for Epilepsy and Paralysis Regent's Park; Assistant Physician, North-West London Hospital.

A GIRL æt. 7 years and 3 months was admitted to Paddington Green Children's Hospital on January 6th, 1893, with the diagnosis "chronic uræmia." She had been for a fortnight under my care for the treatment of headache and vomiting, and I had noticed that her heart was displaced outwards and downwards, that her pulse was of high tension, and that her urine contained one twelfth to one eighth albumin, and its specific gravity was 1006.

Her mother gave the following history:—She was weakly as an infant, and suffered from diarrhœa and vomiting until weaned at twelve months. Her health then improved, and with the exception of measles "when quite young" she had no illness until two months before admission. She then became subject to attacks of frontal headache and vomiting, which occurred two or three times a week, mostly in the early morning, and lasted an hour or so. She often cried or even shrieked with pain. On getting up she felt giddy, and shook and staggered, so that she fell unless her mother held her. Sometimes she complained that she could not see. Vomiting often occurred after taking food, and was preceded by retching and nausea, both with and without violent headache. The vomit consisted of food and yellow or green frothy matter. She generally slept well, but sometimes awoke screaming with headache. Since her illness she had been passing an increasing amount of urine. Her appetite was good, and the bowels

* Delivered before the Society for the Study of Disease in Children, January 18th, 1901.

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were regular. The father died of rheumatic fever and "some brain trouble." The mother was fairly healthy, but was "subject to fits," and had six miscarriages at varying intervals. Two children had died of scarlet fever. Four children were alive, two of whom had had rheumatic fever.

On admission she was thin and undersized. Her complexion and skin generally were sallow and dirty-looking. Her eyes were sunken, and surrounded by dark circles; the conjunctivæ were singularly pale, and the pupils were large. Her hair was dark and luxuriant; her skin was coarse and dry, and there was capillary congestion. No trace of œdema could be found. The finger-nails were somewhat clubbed. She appeared dull and listless, and wore the look of habitual suffering. The fundus oculi and lungs were normal. The heart's apex-beat was in the sixth space, just outside the nipple line. The first sound at the apex was impure, with a doubtful presystolic element. The second sound was accentuated, and was followed by a slight diastolic whiff, heard more markedly at the aortic base. The pulse (90) was very small, hard, and thready, and of extremely high tension. The brachial artery could be rolled under the finger as a hard small cord. The tongue was broad, pale, moist, and somewhat furred posteriorly. The pharynx was congested, and the uvula large and pendent. The liver and spleen were not enlarged. The urine was pale straw-coloured; specific gravity, 1010; neutral; albumin, one half.

On January 10th she cried with headache once or twice, but was not sick; she seemed drowsy. She passed thirty-four ounces of urine in twenty-four hours. Specific gravity 1010; neutral; albumin one third. An abundant white deposit of triple phosphates, a few granular cells, and granular casts were present.

On January 17th she was sick occasionally, but the headaches seemed less severe. In the afternoon, shortly after atropine drops had been put into the eyes for the purpose of ophthalmoscopic examination, the headache became intense. She appeared distracted with pain, and later became unconscious. The eyes were fixed and staring, and she foamed at the mouth. Twitching of the right facial muscles, of the right arm and leg, and of the abdominal muscles on both sides followed. Afterwards the left arm twitched, but not the leg. Twitching was followed by rigidity and flexion first of the right arm, and then of the right leg. The breathing was very shallow, and of Cheyne-Stokes variety. The pulse, at first slow, became very rapid and feeble. Inhalation of chloroform stopped the fit. This had to be repeated, after which there was no recurrence. On coming round she complained of thirst, but not of headache. She seemed rather deaf, and had a wild look, but appeared to understand what was said to her. There was no incontinence of urine or fæces during the fit, which lasted about half an hour. On this day only ℥xxv of urine were passed, and on Jan. 18th only ℥xiv, containing albumin $\frac{1}{8}$th; granular and hyaline casts as before. Vomiting and headache continued. On January 19th the amount of urine rose to ℥ 50. She cried out at times, but seemed rather peevish than in pain.

On January 20th the urine increased to 84 oz. It contained very little sediment, and much less albumin. There was no sickness, or headache, or crying out. She was wasting rapidly. The cardiac apex-beat was forcible. The first sound was murmurish. The second sound was accentuated, especially at base. There was diminution of expansion on the right side of chest. The percussion note was impaired in the right supra-scapular fossa. The breath-sounds were somewhat tubular, with inspiratory and expiratory crepitations. Some rhoncus was audible all over the right lung.

On January 24th 64 oz. of urine were passed. Specific gravity, 1012; alkaline, smoky, and containing for the first time a distinct trace of blood.

On January 30th she had headache during the night. At midday she seemed strange in her manner, and told one of the children in the ward that she wanted poison to drink. Shortly after she seemed stupid and unable to realise what was said to her.

At 4 p.m. she had another fit, in which there was loss of consciousness, lividity, and foaming at the mouth. The breathing was at first stertorous, and later shallow (Cheyne-Stokes type). The pulse 150, small and irregular. The right side, again, was chiefly affected. The eyes were widely opened and turned to the right. The pupils were fully dilated, and there was horizontal nystagmus. The right arm was first flexed across the chest, then twitched violently, and became rigid. Then the right leg became flexed and rigid at the knee and

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hip. The right chest was rigid, expansion being almost entirely on the left side. The abdomen was much retracted.

Under chloroform the breathing became fuller and more even. The spastic movements and rigidity disappeared. The pulse fell to 128, and improved in volume. Ten minutes after the chloroform had been withheld the fit returned. The eyes again turned to the right. The eyelids twitched, and there was nystagmus. The right arm and leg were affected as before, in addition to the left leg. Under chloroform the symptoms again subsided. They returned again in ten minutes, but were finally quelled by administration of chloroform for the third time.

She then slept for a short time, and on awakening seemed deaf and dazed. She cried out that her head hurt her, but she ceased to cry when addressed sharply and loudly. Only 18 oz. of urine were passed on this day. There was no incontinence during the fit.

On the following day (31st) she again passed only 18 oz. of urine; but on February 1st she passed 73 oz., and on the 2nd 106 oz. Specific gravity, 10·10; pale, acid, containing one fifth albumin, and no deposit.

Her mental condition was curious. So long as an attendant was with her she was quiet, but if left alone she would shriek incessantly, "Cannot see," or "My head aches." It was difficult to ascertain whether she was actually in pain. She screamed throughout the friends' visiting hour, and seemed quite unconscious of her surroundings; but when the visitors had gone she told the other children in the ward that she "knew all that was going on." She disturbed the whole building with her cries at night; but when the House Physician, Dr. McIlraith, was called up to see her, she was silent while he remained with her.

She wasted rapidly. There was never any trace of œdema, but the skin of the abdomen became wrinkled and inelastic, and the abdomen itself retracted.

On February 4th the urine again contained blood. Only 22 oz. were passed during the twenty-four hours. Specific gravity, 10·14; albumin, half. The temperature rose from 97° to 102·2°. On this day also there was some left-sided paresis of face, arm, and leg. The tongue was protruded to the left. The pupils were equally dilated. The left side of the chest hardly moved at all in respiration. The breath-sounds were feeble and somewhat tubular, and accompanied by some rhoncus and crepitations. She had difficulty in swallowing. The knee-jerks were absent.

Next day the hemiparesis had also disappeared. She moved both arm and leg, and both sides of the chest worked equally. She seemed unable to see. There was apparently abdominal tenderness. She swallowed quite well, and complained of thirst.

On February 7th the paresis had entirely disappeared, except that the right naso-labial fold was more marked than the left. The cardiac apex was now one inch outside the nipple-line, and in the sixth space. The first sound was impure, the second accentuated. The pulse was small, hard, and irregular. The respiration was shallow, twenty-two per minute. Urine was passed involuntarily. She was semi-conscious, but during the day put out her tongue when asked to do so. She continued to scream at intervals, but gradually the screams became less frequent. Coma supervened, and she died at 5 a.m. on February 8th. The temperature at the time of death was 103·8°.

Post-mortem examination.—Fourteen hours after death rigor mortis was still present. The body was extremely emaciated; there was very little fat in the thoracic and abnominal walls. There was no trace of œdema. There were some small purpuric spots over the sacrum, and also one on the forehead (ante-mortem). There was general brownish yellow discoloration of the skin.

There was a slight amount of clear fluid in the pericardium. There were no adhesions. The heart generally was large. The left ventricle was extremely hypertrophied and slightly dilated. Both auricles and ventricles contained some amount of fibrinous clot formed *in articulo mortis*. The valves were healthy.

There were neither fluid nor adhesions in the pleural cavities. At the left apex of the left lung a small, hard, cheesy, tubercular mass, the size of a hazel nut, was found. The lung around this was somewhat puckered. The rest of the left lung, and also the right, was healthy.

The liver was somewhat congested; otherwise it looked healthy.

The spleen was normal in size and appearance.

In the kidneys there was considerable inflammatory matting of the perinephritic cellular tissue.

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Both kidneys were distorted, puckered, and shapeless. The capsules were adherent in parts, but not universally so. The distortion of the kidneys was most marked where the capsules were most adherent. On section they were coarse and tough, mottled yellow in colour. There were a good many small hæmorrhages scattered in their substance. There was little apparent distinction between the cortex and medulla, but the cortex, where it could be identified, was atrophied. The left kidney weighed 1¼ oz. Its pelvis was dilated, but not the ureter, and there was no obstruction

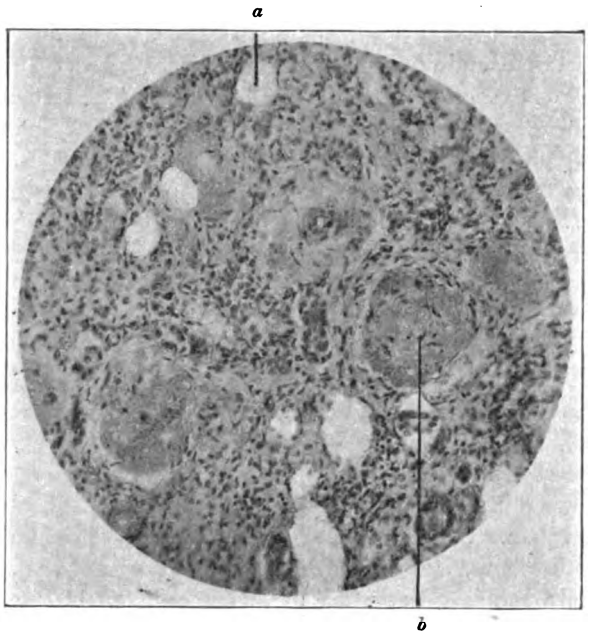

FIG. 1.—Section of kidney. *a*. Small cyst. *b*. Hyaline degeneration of Malpighian body.

to the entry of the latter into the bladder. The right kidney weighed 3¾ oz. Its lower portion was shrunken and irregular. The upper part was firm and more normal in appearance than any portion of the kidneys elsewhere. *Microscopically* the sections showed general diffuse increase of interstitial tissue. In parts of the supporting stroma there were disseminated patches of cellular infiltration, suggesting a more recent interstitial inflammation supervening on a fibrosis of old standing. The capsules of the glomeruli were in many places thickened by fibrosis, and also surrounded by more recent infiltration of inflammatory cells. Some of the glomeruli were only represented by patches of opaque hyaloid material, which did not stain well. Some of the arterioles were patent, yet all their coats showed considerable hypertrophy, such as almost occluded the lumen of others. The tubular epithelium in the places which showed presumably recent interstitial inflammation was cloudy and opaque, and showed a marked tendency to fall out, leaving empty spaces or minute cysts. In some places the epithelium seemed healthy, but for the most part it was granular. Numerous punctate hæmorrhages were visible to the naked eye in the sections, and also under the microscope. The condition of the kidneys may be described as one of diffuse interstitial nephritis, both of old standing, and apparently of recent date. The parenchymatous changes were less marked than the interstitial, and probably were secondary to them. They cannot be regarded as typically granular kidneys, but there can be no doubt that they were in the way to become so generally, as they had already become so in parts. The supra-renal capsules were un-

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fortunately not examined microscopically. They appeared, however, to be normal, except that they were involved, especially the left, in the inflammation which affected the perinephritic cellular tissue.

The brain was large and well-developed. The blood-vessels were generally engorged. The arteries at the base were patent, but not obviously thickened. There were no miliary aneurysms. The posterior part of the right vertex was darkly

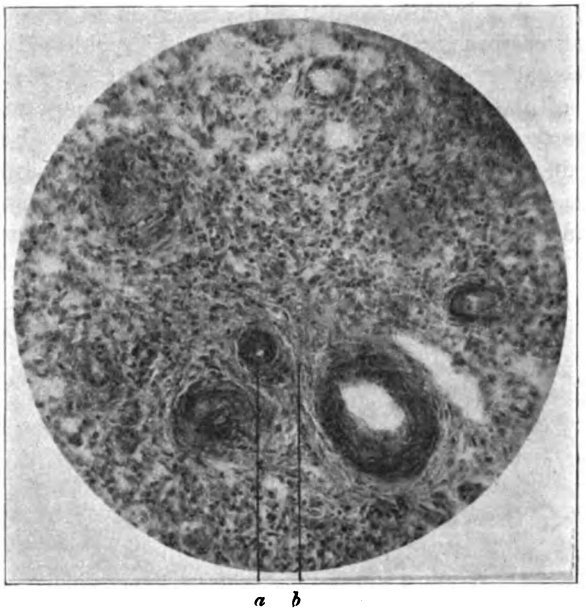

FIG. 2.—Section of kidney. *a*. Thickened vessel with lumen almost occluded. *b*. Fibroid tissue.

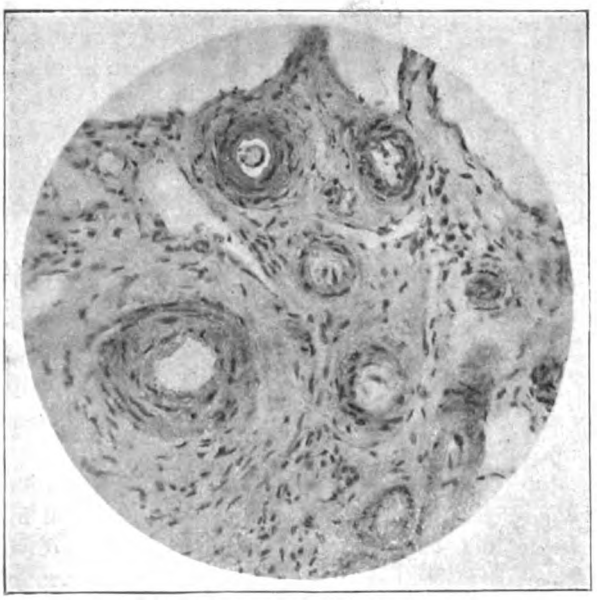

FIG. 3.—Section of kidney showing thickening of vessel walls.

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discoloured behind the level of the ascending parietal convolution. On making the usual sections, a hæmorrhage as large as an egg was found in the right centrum ovale majus; it was beneath the level of the grey matter. At a lower level than this was found a second hæmorrhage, as large as a golf-ball, in the right occipital lobe; it extended within a couple of lines of the external cortical surface of the brain. The central portions of the clots were brick red in colour and fibrinous, but externally the blood seemed more recently extravasated, being dark and semi-fluid. No source of the hæmorrhages could be discovered. In addition to these hæmorrhages there were several others in various portions of both hemispheres. They varied in size from a pin's head to a pea. None of large size were observed in the left hemisphere. *Microscopically* there was general capillary congestion of the brain. The walls of the arterioles, both meningeal and cerebral, were unmistakeably thickened in all three coats, which appeared fluffy or woolly, and ill-defined. In some places minute hæmorrhages were found in association with small vessels (arterioles), which had apparently burst.

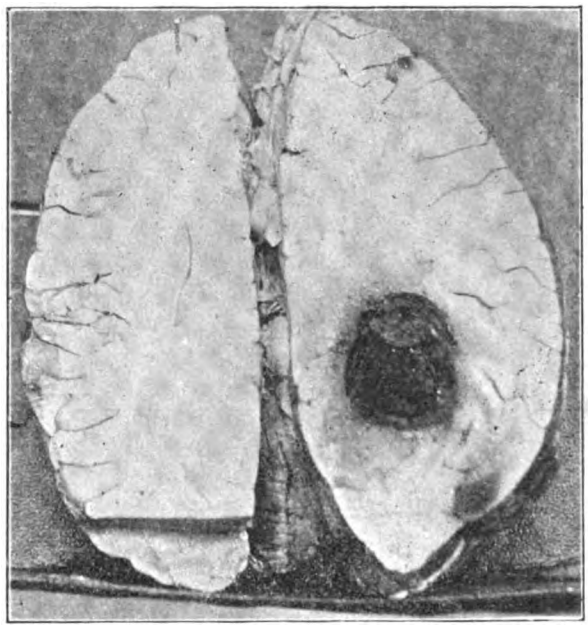

FIG. 4.—Section of brain. Showing hæmorrhage, size of hen's egg, in posterior part of right centrum ovale majus.

The history, course, and termination of this patient's illness, her symptoms and physical signs, would be common enough in adults upwards of fifty, but are very rare in children under fourteen. In a paper on "Chronic Interstitial Nephritis in Childhood," published in the 'Lancet,' vol. i, 1897, I collected eight similar cases to the present. The youngest patient was five years old. Another instance, in a girl aged twelve, has been recorded by Sutherland and Lawson ('Trans. Ophth. Soc.,' vol. xix, 1899). The symptoms in all cases were much alike. They were chiefly uræmic, characterised by frequent attacks of headache and vomiting, amaurosis and giddiness. Sometimes tetany, cramps, and opisthotonos were noted. Convulsions and coma occurred in six. Cardiac symptoms, such as palpitation, dyspnœa, and præcordial pain were met with in three. Gastro-intestinal symptoms, such as diarrhœa, epigastric and abdominal pain, were not uncommon, and also symptoms of bronchial catarrh and pulmonary œdema. Great thirst, with or without voracious appetite was noticeable in some. The urinary symptoms were polyuria and often enuresis, the urine being of low specific gravity, and containing albumin.

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hyalin and granular casts, and occasionally blood.

The physical signs were progressive wasting, the skin becoming dry, wrinkled, discoloured, or even pigmented, as in Addison's disease, and anæmia. The cardio-vascular signs consisted in gradually increasing hypertrophy of the heart (especially of the left ventricle), high pulse tension, and general thickening of the arteries. In some, hypertrophy of the heart gave way to dilatation, but only in one (Sutherland and Lawson's) was incompetence sufficient to produce extreme dropsy of the cardiac type. In all the others but one dropsy was absent from first to last, and in the exceptional case it only occurred shortly before death, and was limited in extent.

Albuminuric retinitis was only discovered in one case (Sutherland and Lawson's).

The duration of the disease, counting from the onset of symptoms, varied from three weeks to five years. In my own case the duration was three months.

The cause of death in four out of nine cases was intra-cerebral hæmorrhage. The percentage of deaths from this cause may be compared with that which obtains in adults. Dickinson stated that 41 per cent. of all cases of cerebral hæmorrhage were due to granular kidney; Pye-Smith gives 75 per cent.; the statistics of St. Bartholomew's Hospital, however, only show a mortality of 15 per cent. from this cause. (West, "Some Clinical Aspects of Granular Kidney," 'Trans. of Med. Society,' 1899, p. 172.)

Intra-cerebral hæmorrhage in young children is of course extremely rare, although meningeal hæmorrhage is not uncommon. In the latter case it is usually capillary, and associated with infantile scurvy, purpura, and congenital syphilis, apart from the well-known supra-cortical hæmorrhages due to injury at birth. But intra-cerebral hæmorrhage in infants and young children, as in adults, is probably always caused by disease of larger vessels than the capillaries. It is impossible that healthy vessels should burst, however forcible the heart, and however high the arterial tension may be.

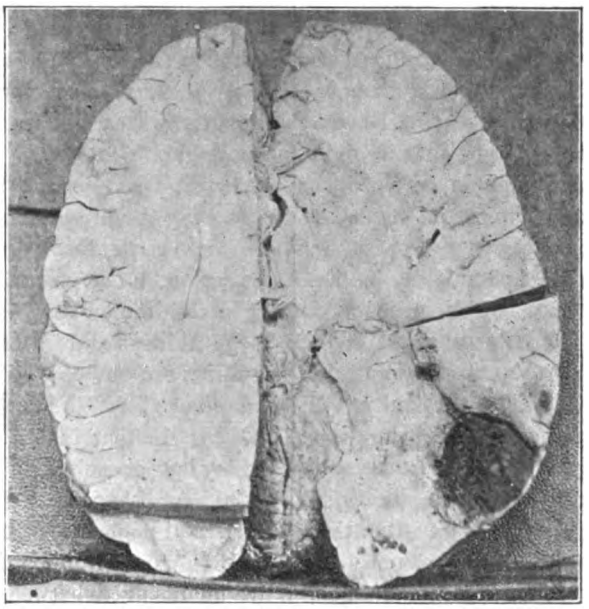

FIG. 5.—Section of brain. Showing hæmorrhage, size of golf ball, in right occipital lobe.

In some cases miliary aneurysms have been found, dependent on embolism following endocarditis. General tuberculosis has been present in some. In seven fatal cases atheroma of the

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cerebral arteries was discovered. In two of these (Filatoff's and Dickinson's) contracted kidneys were also found, and we may add to these the present case and Sutherland's and Lawson's, in which there can be no doubt that general arterial degeneration, akin to that found in adult subjects of granular kidney, existed. Hence we may conclude that the chief cause of cerebral hæmorrhage in children, as in adults, is granular kidney. The cause of death in most of the other cases of chronic interstitial nephritis was uræmia, ending in convulsions and coma. In one instance death is said to have been due to gradual exhaustion, in another purulent peritonitis closed the scene.

An interesting point in the present case is that the convulsions were almost entirely confined to the right side. They were nevertheless uræmic, the left side escaping owing to the partial hemiplegia caused by the hæmorrhages in the right hemisphere. As in adults, uræmic convulsions are of far graver import in interstitial nephritis than in the parenchymatous variety.

Diagnosis.—There can be no difficulty in diagnosing a well-marked case. The disease runs a typical text-book course, and the physical signs and symptoms are precisely the same as in adults suffering from granular kidney. Difficulty will only be experienced in early stages, and the cases for which they are most likely to be mistaken are those associated with the so-called uric acid diathesis in children. Such children are often thin and undersized; they suffer from severe headaches, the pulse tension is often abnormally high, the urine is often scanty, high-coloured, and acid. There may be albuminuria, intermittent or cyclical, and the presence of blood, free or in casts, in the urine is not uncommon. The chief points of distinction besides the differences in urine are, that in interstitial nephritis there is not only high pulse tension, but the vessels are thickened and hard, whereas in uric acid cases, although the tension may be high, there is no thickening of the vessel walls.

The prognosis in uric acid cases must, however, always be guarded, and must be left for the next generation to decide.

Causation.—Dickinson gives as the causes of granular kidney, gout, lead, alcohol, cardiac changes leading to renal congestion, pregnancy, obstructional anuria, mental conditions, worry, etc., perhaps intermittent fever, and "a general fibrotic tendency affecting many organs and tissues, notably the arteries and kidneys." This last is rather a statement of a fact than an explanation of its occurrence, yet it is important as an observation that interstitial nephritis is no merely local disease of the kidneys, but a disease which affects the entire arterial system as well. In the case of all the children the other causes may be dismissed.

Scarlatina naturally occurs to every mind as a likely cause in children, but it may be positively excluded in most, though not all, of the cases. And even when a history of scarlatina has been forthcoming, the whole course of the nephritis is so unlike the ordinary post-scarlatinal variety that we are justified in seeking some other explanation. Similarly, we cannot regard the kidneys as being in a final or contracting stage of parenchymatous nephritis, for there is no history of symptoms suggesting the pre-existence of large white kidney. We must go far back into the life-history of the patient to find a probable origin of the disease; for in children and adults alike the changes found in the kidneys and vascular organs in interstitial nephritis are obviously of longer standing than the symptoms.

It may be that in old and young alike granular kidney is the result of a more or less acute interstitial nephritis occurring in infancy. Such acute interstitial nephritis has been described by Emmett Holt ('Arch. of Pediatrics,' 1897, vol. iv, p. 1) in five infants aged between two and a half months and two years. The condition was verified post mortem, but the symptoms were not in most cases suggestive of nephritis. They were usually gastro-intestinal or cerebral. Dropsy was absent in all, and the urine did not in all cases afford a clue to the nature of the complaint.

It is quite conceivable that subacute attacks in infancy may set up a continuous and insidious process of degeneration or inflammation, ending more or less late in life in granular kidney. The cause of such intestinal nephritis in infancy is obscure. Holt considers scarlatina as non-proven in his cases. Chill has been suggested as a cause, but were this so, the disease would certainly be less rare than it is.

Attention has recently been drawn to syphilis—both congenital and acquired—as a cause of

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granular kidney and its associated cardio-vascular changes. Amonst recent writers Drs. Fordyce and R. H. Greene have described cases occurring in the acquired syphilis of adults which are indistinguishable from those of ordinary interstitial nephritis ('Journ. of Cut. and Urinary Diseases,' April, 1897, and p. 12, 1898). Whilst Massalongo, of Verona (Int. Med. Congress, Rome, 1894; 'Med. Rec.,' April 28th, 1894), described very completely a case of interstitial nephritis in a syphilitic infant aged eight months. Uræmia was the cause of death, and endo- and peri-arteritis, typical of interstitial nephritis, were found both in the kidneys and in the liver and spleen. He concluded that "in precocious syphilis of the kidneys, the anatomical changes of interstitial nephritis may occur without a previous stage of the parenchymatous lesion," and also "that syphilitic infection, at least the congenital variety, may primarily compromise in an acute manner the arterial system, and produce in consequence dystrophic alterations in various organs."

Although I have not been able to verify by post-mortem examination the existence of interstitial nephritis in syphilitic infants, I have frequently suspected it. Syphilitic infants—especially those in whom cutaneous eruptions are prominent—often thrive for a few weeks on mercury; then, when the improvement manifested has caused general satisfaction, they are seized with convulsions and die. The probability that such convulsions are uræmic, and determined by the action of mercury on syphilitic kidneys, already inadequate, is worth consideration. In its favour I may say that some years ago, after a series of such accidents amongst out-patients, I took to giving mercury with less freedom and greater caution than I had used before, with the result that the mortality in my practice was considerably lowered.

As regards the older children with whom this paper deals, the evidence of hereditary syphilis is not conclusive. In my own fatal case there was no definite history of syphilis, but the child's mother had had six miscarriages. The father died of "some brain affection," which might or might not have been due to syphilis, and the child herself had the stunted wizened appearance common in congenital syphilis. In the other cases the possibility of a syphilitic origin does not seem to have occurred to the observers.

On the whole, although evidence is far from being conclusive, I am inclined to think that chronic interstitial nephritis in young children is due to hereditary syphilis. And, if so, hereditary or acquired syphilis may also account for many cases of granular kidney in adults.

Significant facts in favour of such a view are that granular kidney is very frequently found on post-mortem examination of the insane. Beadles found it in 70 per cent. of cases dying at Colney Hatch ('Journ of Med. Science,' January, 1895). Also the highest mortality at asylums occurs amongst general paralytics,* and it is almost universally held at the present time that syphilis is *par excellence* the cause of general paralysis. Hence it is not unreasonable to assume that syphilis is also a more frequent cause of interstitial nephritis or granular kidney than is usually suspected.

It is open to question whether gout and lead are actual causes of granular kidney. It may be that the subjects of granular kidney are specially liable to suffer from gout and plumbism, owing to renal inadequacy. As regards alcohol, again, which is always considered to be the most potent agent in producing granular kidney, it is possible that alcoholism is the result rather than the cause of the nephritis. A prominent symptom of interstitial nephritis is polyuria, and polyuria naturally begets thirst. Thirst is quenched by alcohol, and alcohol results in drunkenness. A Scottish drunkard defended his evil habits by saying, "Ae body kens o' my druckenness, but naebody kens o' my drouth."

[For the careful notes of this case I am indebted to Dr. C. H. McIlraith, late House Physician to the Children's Hospital, Paddington Green.]

* Beadles (op. cit.) gives the following percentages of causes of death at Banstead; Cane Hill; Hanwell; and Colney Hatch, as follows:

General paralysis	= 25·69 per cent.
Renal disease	= 1·27 ,,
Arterial degeneration	= 3·94 ,,
Cardiac disease	= 5·51 ,,
Chronic brain disease	= 15·39 ,,
Senile decay	= 8·38 ,,

It will be noticed that nearly all these conditions are in keeping with the existence of granular kidney.

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WITH MR. PERCY FLEMMING AT UNIVERSITY COLLEGE HOSPITAL.

The External Examination of the Eye.

In ophthalmic practice, as in all other departments of medicine and surgery, it is of the greatest importance to have a definite and systematic method of examining cases; only by pursuing such a method in all cases can one guard against the fault of omitting to note all the physical signs; and one becomes more and more convinced that the mistakes that are made in practice arise rather from neglecting to observe some point, than from misinterpreting other factors in the case which have been quite accurately noted.

The examination of an eye case falls into three divisions:—first the examination of the exterior parts of the eye, including the lids and neighbouring parts, as well as the eyeball itself; next the examination of the patient's visual acuity; and finally, the examination by artificial light with a lens (focal illumination), and with the ophthalmoscope.

I propose to-day to consider the external examination of the eye, taking in the order met with the various structures from front to back, *i. e.* lids, conjunctiva, cornea, anterior chamber, iris, and pupil concluding the examination by investigating the hardness or tension of the globe, the movement and position of the eyeball.

Commencing, then, with the *lids*, What are the points to be looked to? In the first place, notice any skin *eruptions* present on the lids, especially looking for herpes, which may show merely as scattered red patches with little scabs on them. Eczematous eruptions are common and easily recognised, and as rarities may be mentioned vaccinia and variola. The lids are frequently found to be œdematous and *swollen*, and it is important to investigate whether the swelling is due to some obvious local lesion, such as a sty, chalazion, abscess of lid, lachrymal abscess, bites and stings, erysipelas, etc. If no such local cause be found, and the swelling is red (inflammatory), the trouble must be deep-seated—panophthalmitis, orbital cellulitis, orbital growths, lesions of cavernous sinus, etc. One must remember, too, that the swollen lids may be due to some general cause like Bright's disease. In the next place note the position and direction of the *eyelashes*, whether they are turned in and in contact with the globe, noting especially whether such turning in (trichiasis) is permanent, or whether it occurs only after the lids have been tightly closed (spasmodic entropion). In this connection, too, should be noticed whether the lashes are deficient in number, and whether there be any discharge adhering to them. Occasionally pediculi may be found on the lashes. Then note the size and position of each *punctum lacrymale*, remembering that they should be directed towards the globe, and not visible unless the lid be everted, and that they are situated where the curved margin of the lid becomes straight. Sometimes foreign bodies and eyelashes may be found in the puncta, and attention should always be directed to this point when the patient presents a little raised spot of inflamed and irritated conjunctiva just external to the caruncle. Finally, as regards the lids, one would notice the presence of ptosis (complete or partial), the functional activity of the orbicularis as shown by the ability to close the eyes tightly, and the size of the palpebral fissure. The examination of the parts outside the globe is completed by looking for and noting any swelling in the neighbourhood of the lacrymal sac, frontal sinus, antrum, etc., whether such swelling is fluid or solid; and in case of a swelling of lacrymal sac note whether its contents can be squeezed out. Definite tumours, cysts, rodent ulcer, epithelioma, etc., should, of course, be noted, and their precise relations to skin, conjunctiva, and lashes ascertained.

The next step is to examine the *palpebral* and *ocular conjunctiva*; this may be quite simple, but in acute cases, and especially in children, the lids may be so tightly closed (blepharospasm) that it is no easy matter to separate them, and, of course, it is just in such cases that examination is all important. In these cases the lids are best separated by placing the thumb or forefinger of each hand on the lids *as close as possible to the ciliary margin*—the child being recumbent,—and to press the lids back against the globe at the same time as the thumbs or fingers are gently withdrawn from one another; in this way the lids will be prevented from everting, an event which is sure to happen unless the pressure is made backwards, and if the

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fingers be applied to the surface of the lid. In a simple case one first gently pulls down the lower lid, and examines its lining conjunctiva, then by further pulling down, the patient looking up at the same time, examine the fornix or region where the ocular passes into the palpebral conjunctiva; next examine the bulbar conjunctiva, and finally complete the examination by everting the upper lid to examine its lining conjunctivæ and fornix. *To evert the upper lid* tell the patient to look down; then place the index finger on the lid *above* the tarsus, and by a little downward pressure make the upper lid just ride over the upper margin of the lower lid; then place the thumb below this projecting edge of the upper lid, and bend the lid back on the index finger which has kept its place above the tarsus. This method is quite easy to acquire, and I think simpler than seizing the lid by the lashes and bending it over a probe. The points to notice about the conjunctiva are:—Its smoothness or roughness, if rough, where the unevenness is most marked; its vascularity, noting particularly if the redness is more marked in the palpebral conjunctiva and fornix or over the globe; whether the conjunctiva (ocular) be swollen and raised up round the corneal margin (chemosis); the abundance and nature of discharge—mucus, muco-pus, or pus; the presence of old scars indicating past chronic inflammation; the presence of any membrane on the conjunctiva, and if so, whether it be adherent or easily stripped off. It is useful and important to be able to distinguish which particular group of vessels is full and causing the eyeball to look red. Three systems of vessels are to be distinguished:—First, the anterior conjunctival vessels. Hyperæmia in their territory is shown by the general brick-red colour of the injection, by the fact that the vessels can be made to glide over the sclerotic, and particularly by the fact that the general redness gets less and less the nearer one travels to the cornea, *i. e.* the palpebral conjunctiva and the fornix will be the places of maximum redness. Second, ciliary or pericorneal injection is hyperæmia of those fine episcleral twigs which are derived from the anterior ciliary arteries just before they perforate the sclerotic; these vessels are invisible in health, but when engorged they form a pink zone of congestion immediately around the cornea, the individual vessels being arranged in a radial manner, and in contra-distinction to conjunctival vessels, cannot be moved over the sclerotic. And third, there is a system of vessels connecting the anterior ends of the episcleral twigs with the anterior end of the conjunctival vessels, forming a loop plexus around the corneal margin, superficial, of course, to the episcleral vessels; the vessels forming this plexus become engorged and prominent in superficial corneal lesions, *e. g.* foreign bodies, and, indeed, their presence may afford a guide to the locality of a small foreign body on the cornea.

The *cornea* is next to be examined. This is best done, in the first instance, by putting the patient in front of a window and noting whether the image of the latter formed on the cornea is in all positions quite sharp and bright, and not broken or blurred. In this way any unevenness or irregularity in curve is noticed. Next look for any loss of transparency; a dull opaque spot may be of old standing, a remnant of past ulceration (nebula or leucoma), or it may be a recent infiltration (ulcer); in this latter case the surface will be rough and uneven, and there will be evident signs of hyperæmia. In any doubtful cases it is well to put in a drop of fluorescine solution (fluorescine gr. x, sodæ bicarb. gr. xv, aq. destill. oz. i),—any spot where the epithelium is *absent* is stained a bright yellowish green, the normal cornea does not take the stain at all. The examination of cornea is more efficiently carried out by bringing the light to a focus on the different parts of the cornea by means of a large convex lens. An opacity being found, its situation must be noted, namely, whether superficial, in the substance of the cornea, or on its posterior surface; this may usually be satisfactorily enough ascertained by focussing the day-light on the cornea, but for detailed examination the patient must be examined in the dark room. With artificial light two methods are used:—(1) The ophthalmoscope used as for direct examination, but with a high convex lens (+20 D.) behind the sight hole; (2) with the corneal magnifier, *i. e.* a small compound lens held close to the cornea, the latter being at the same time illuminated by focussing the light from the lamp placed in front of the patient with the simple large lens.

The next region to be investigated is the anterior chamber, and the points to be noted are:—

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(1) its depth, and (2) its contents. The depth is estimated by looking at the eye from the side and then from in front, and observing how far the iris is separated from the cornea. The chamber may not be uniformly deep, *e.g.* the base of the iris may be retracted, making the chamber deep at the periphery, or the iris may be bulged forwards in its central portion. Of course one can only get to realise what the depth of a normal chamber is by observing healthy eyes, and it will be noticed that the chamber is normally more shallow in old age than in middle life. As regards contents of the chamber, one looks particularly for blood (hyphæmia) and pus (hypopyon). The appearance of these is characteristic, the fluid gravitating to the bottom and having a well-defined horizontal upper edge, which will shift with the position of the patient's head. In other cases the fluid in the chamber is turbid though not actually purulent.

The *iris* must be examined with regard to its colour, its lustre, its thickness and its steadiness on movement of the eyes. In noting its colour one must of course compare it with its fellow: bearing in mind that the two irides may be of different colours as a congenital abnormality. Congestion of the iris is shown by its surface having a dim look—want of lustre,—and by a change in colour—a blue iris becoming green, a green one yellow-green, and a brown one reddish or yellow-brown. The whole iris may seem thin, or it may seem thin in spots—the uvea on the posterior surface showing through at these places. The iris should, of course, be quite steady and fixed when the eyeball is moved; in some cases, however, it exhibits a tremor, which may be quite obvious, or require very careful looking for. This tremulousness of the iris implies want of support behind, due either to removal or displacement of lens, or to weakening of its ciliary attachment and a too fluid vitreous.

In the examination of the pupil one first takes note of its size, and if abnormally large or small, measures it by comparing it with a millimetre scale held close to the eye. At the same time one would notice the relation of pupil to iris, whether central or eccentric; also its shape, and whether both pupils are equal. The pupil *reacts* to three kinds of stimuli. First, it contracts on exposure to light, and dilates in the shade; secondly, it contracts in association with efforts of accommodation, the latter being usually, though not necessarily, combined with movements of convergence; and thirdly, it dilates when the sympathetic in the neck is stimulated, or when the skin over it is pricked or pinched, or faradised. Thus there are two reflex movements of the pupil (to light and cutaneous stimuli), and one associated movement. To test the reaction to light, the patient is made to face the light; the observer covers both the patient's eyes, and then rapidly removes one hand and notes the movement of the pupil—whether it contracts at all, and if so, whether the movement is performed slowly or briskly, and whether the contraction is maintained. The other eye is treated in the same way. But it is possible for one pupil to remain motionless when exposed to light, and to contract readily when light falls into the other eye. This is called the consensual reaction to light, and should always be tested for in cases in which one pupil does not react to direct stimulation. To test for the reaction to accommodation, the patient is made to look first at an object in the distance, and then at an object—pencil or finger—held close to the eyes. In doing this it is important to prevent the reaction to light coming into play as well. Thus the ophthalmoscope mirror is not a good near object to employ. Lastly, the skin in the neck is pricked—*e. g.* with a quill,—and dilatation of the pupil looked for. It is important in trying this reaction to have the pupil exposed to a moderate light only. Usually loss of sympathetic (skin) reflex is associated with loss of light reflex, but loss of the latter may occur, with retention of the associated movement (reaction to accommodation). Further, though the ciliary muscle be paralysed (as in diphtheritic paralysis), yet the pupil may react in response to mental effort to look at a near object—*e. g.* the patient's own thumb. Cocaine dilates the pupil through the sympathetic, and in suspected cases of sympathetic paralysis this reaction should be noted. Before drawing any conclusions as to mobility or otherwise of the pupil, the presence of synechiæ must be noted. Synechiæ are of two kinds, anterior and posterior; the former are adhesions of iris to cornea, and are easily seen; the latter are adhesions of iris to lens. The presence of posterior synechiæ are suspected when the pupil has an irregular shape, and they can be demonstrated by putting a drop of atropine in the eye, which will cause the pupil to dilate

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between the adhesion, making the latter much more obvious. Or there may be complete posterior synechia, the entire circumference of the pupil being bound down. Atropine will, of course, have no effect on such a pupil. To be carefully distinguished from posterior synechiæ are the thread-like remains of the pupillary and capsulo-pupillary membranes. Such threads always come from the *anterior* surface of the iris, and, being elastic, do not interfere with the mobility of the pupil; but, like synechiæ, they may be pigmented. Finally, the pupillary area should be examined for inflammatory products—spots of pigment, etc.;—and this is best done by focal illumination, using daylight or artificial light. A grey reflex obtained from the pupillary area in old people merely indicates sclerosis of lens, and is *not* due to any lenticular opacity. Such a lens will appear quite clear when looked at by direct illumination with the ophthalmoscope. In testing the reactions of the pupil it should be remembered that with advancing age the pupils tend to become smaller and less active.

In cases of hemianopia it is important to observe the reaction of the pupil when light is thrown into the eye, first from one side, and then from the other, by means of the ophthalmoscope mirror. In some such cases the pupil will react when light falls on the blind half of the retina. In others it does not; and the presence or absence of this hemianopic pupil reflex is an aid to localising the position of the lesion causing the hemianopia. But it must be allowed that the test is difficult to apply accurately.

In a case of *squint* there may be no difficulty in determining which is the fixing eye, but in other cases this may not be so obvious. In these cases ask the patient "to fix" an object held about eighteen inches from the eyes, and then cover with a card first one eye and then the other. If each eye remains quite steady under these conditions, there is no squint; but if, on covering one eye the other one moves "to fix" the object, obviously it was squinting before. When the squinting eye is made to fix, the sound eye will deviate behind the card held in front of it. This is spoken of as secondary squint, or deviation; and in all cases of paralytic squint it is greater than the primary squint—*i. e.* the squint when the sound eye fixes. The range of *movement of the eyeballs* is estimated by making the patient look at a pencil moved up and down right and left, estimating the former by the relation of the cornea and *lower lid*, and the latter by the extent to which the cornea can be moved to the inner and outer canthus. The absolute amount of movement possible varies in different individuals, and a comparison must be made between the two eyes.

One eyeball may appear more prominent than its fellow. To estimate slight amounts of this proptosis or prominence, the patient is seated, and the observer, standing behind, gently lifts up each upper lid till the cornea of the normally placed eye is seen to be in a line with the eyebrow; then it can easily be seen if the cornea of the other eye is in front of this plane or not. The prominence of the eye may depend upon its actual enlargement, or upon its being protruded by orbital growth, etc.

To estimate tension, rest the hands by placing the middle finger on the patient's forehead; then tell the patient to look down, and with the two index fingers examine the globe through the lid in a manner similar to feeling for fluctuation elsewhere. Note how hard the globe feels, and compare it with the other one.

TREATMENT AFTER ABDOMINAL OPERATIONS.

A Post-Graduate Lecture delivered at the West London Hospital,

By L. A. BIDWELL, F.R.C.S.,

Senior Assistant Surgeon to the Hospital, and Dean of the Post-Graduate College.

(*Continued from p.* 304.)

Nursing.—The nursing of abdominal cases can be undertaken in the general wards of a hospital, so long as the patients are never left entirely alone. In hospital I do not remember ever having ordered special nurses for an operation case, but in private I find it necessary to have two nurses for the first week, so that the patient may always have one with him. No special qualification is required for the nurse; she must be a good surgical nurse, and must be able to pass a catheter on a female without disturbing the patient, and must also be skilled in giving nutrient and aperient enemata. She must also never act on her own initiation with regard to feeding, but implicitly follow the directions which

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are given. Particular care must be taken that the back of the bandage does not get wet, either when the patient passes urine, or after an enema. If so a fresh bandage should be immediately applied, as a patient enfeebled by starvation is peculiarly liable to bedsores. There is no necessity to pass a catheter if the patient can pass urine naturally, but if he is unable to do so the catheter must be passed at intervals of not more than ten hours.

The nurse must take the temperature and pulse rate every four hours, and must keep a detailed diary of the exact amount of nourishment and of stimulants given, and of sleep taken during the day. The pulse is of special importance, and I pay more attention to it than to the temperature, since I regard a rapid pulse as an imperative indication for alcohol.

Feeding.—The ordinary time to commence feeding after any operation, is when the sickness caused by the anæsthetic ceases; but as the stomach is always somewhat deranged by the anæsthetic, easily assimilated nourishment, such as beef-tea and barley-water are usually given at first. In most severe abdominal operations, nothing except teaspoonfuls of hot water are given for the first twelve hours, and then beef-tea and barley-water are commenced in small doses, half to one ounce being given every two hours. Milk I consider is unsuitable to commence with, as it forms clots which are apt to irritate the stomach, and so cause further vomiting; it should therefore only be given to patients who object to beef-tea or peptones, and should then be peptonised. The question which requires discussion is, whether a case of operation on the stomach should be treated on lines differing from any other severe abdominal operation. Opinions are rather divided on this point, but I think that the balance of opinion is now in favour of early feeding, and MM. Terrier and Hartman remark, that the more stomach surgery they do, the earlier they give food. The argument used by Kraske is to the point; he says, "What matters a small quantity the more of liquid in the stomach when there is always, in cases of dilatation, a morbid secretion of catarrhal mucus, and consequently a considerable quantity of liquid." He and Roux advocate feeding from the day after the operation, and the latter gives his patient all that he desires, even beefsteak! While not going so far as this last-named surgeon, I am strongly in favour of early feeding, especially when we consider that nearly all the cases are half starved before the operation, and have to satisfy not only the ordinary demands of the system, but also the extra strain put on them by the operation. Other surgeons, on the contrary, are less liberal; for instance, Maylard gives ice only by the mouth for forty-eight hours, nourishing the patient entirely by nutrient enemata.

Special methods must be employed in different operations on the stomach, and for the purposes of feeding the operations may be divided into:—(1) gastrostomies, (2) most other operations including gastrotomy—gastro-enterostomy, pylorectomy, etc., and (3) gastric ulcer operations.

In gastrostomy the conditions are rather peculiar, since, while the patients have been starved, and require immediate nourishment, the stomach has become contracted, so as to be only capable of containing a very small quantity. The method of feeding, therefore, must be to give frequently a small quantity of highly nutritious but easily digested food. The proteids should be in a fine state of division, and should be previously digested; the nourishment should also contain fats and hydrocarbons, grape sugar being the best form to commence with. All food should be of the body temperature, and should be made to enter the fistula by gravitation, care being taken not to allow air to be sucked in during the feeding. A small funnel, connected by an india-rubber pipe to the gastrostomy tube, is the simplest apparatus. Various preparations are given. The food which I usually give is practically of the same composition as a nutrient enema, namely, a mixture containing milk, 4 oz.; beef-tea, 4 oz.; two eggs; brandy, ½ oz.; and liq. pancreaticus, 2 drs. This is to be made half an hour before use, so as to insure peptonisation. Grieg Smith recommends the use of underdone meat, pounded into a pulp and suspended in milk, and then peptonised. Alternate meals may contain starchy or fatty foods.

If the stomach is opened at the time of the operation, it is best to give then nothing but a little brandy and water by the tube, and to defer feeding till the next day. When the operation is performed in two stages, the stomach being opened on the second or third day, the patient is nourished by nutrient enemata in the interval, and immediately

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on opening the stomach the feeding is commenced. At the first feeding I usually give 3 oz., and repeat this every three hours; on the second day I give 5 oz., which is also repeated every three hours; on the third day the quantity is increased to 8 oz., and is only given every four hours; the quantity is then increased on the fourth day to 10 oz., on the fifth day to 12 oz., on the sixth day to 15 oz., and on the seventh to one pint.

At first this is combined with nutrient enemata and suppositories, but the nutrient enemata are omitted on the second day of feeding, and the suppositories on the fourth day. The amount of brandy, too, in the food is diminished.

Special care will be required in the management of the wound if there be any leakage of gastric contents. This will certainly produce a good deal of irritation, but can be combated by dressing the fistula with a quantity of carbonate of magnesia and sterilised gauze. It is a noteworthy fact that a fistula will leak if the gastric juice is hyperacid and the patient is very feeble, but will be quite free from any leakage when the patient has regained strength and the acidity of the gastric juice is normal.

After an operation for pyloric obstruction, whether it be a gastro-enterostomy, a pylorectomy, or a pyloroplasty, the method of feeding will be the same. Nothing is given by the mouth for the first eighteen or twenty-four hours except teaspoonfuls of hot water. Nutrient enemata and suppositories are given every three hours alternately. If there is no sickness, feeding is commenced by the mouth on the morning following the operation. I usually give half an ounce at a time every two hours, and give barley-water and beef-tea, or Valentine's extract, etc. On the following day the amount given by the mouth is increased to two ounces every two hours, and the nutrient enemata are stopped, the suppositories still being given every four hours. On the third day the quantity of food is increased to five ounces; an egg and a little wine are added to the dietary. On the fourth day the suppositories are discontinued, custard and jelly being allowed. On the fifth day Benger's or other malt food is added; and on the sixth day milk, tea, etc., are given. Fish is given on the eighth or ninth day, and chicken immediately afterwards. This, of course, is for an uncomplicated case, and as illustrations I have copied out the diet sheets of a case of pyloroplasty and of a case of pylorectomy, both of which made uneventful recoveries.

Pyloroplasty case.—Operation May 19th, 10.30 a.m. Nothing by mouth except hot water during day; the patient was sick once only. Nutrient enemata every six hours, and nutrient suppositories every six hours alternately. May 20th.—Barley-water in half-ounce doses, or Valentine's meat-juice, one drachm in half an ounce of water, given alternately every two hours. May 21st.—Barley-water in two-ounce doses, and two drachms of Valentine's meat-juice in two ounces of water, given alternately every two hours. Nutrient enemata stopped. May 22nd.—Barley-water in five-ounce doses, beef-tea in five-ounce doses, strengthened with one drachm of Valentine's meat-juice; also yolk of egg beaten up with one and a half ounces of water, or half an ounce of port wine jelly; one or other of these every two hours. Nutrient suppositories given every four hours. Normal motion without any aperient. May 23rd.—Food still given five ounces at a time, either Benger's, yolk of egg, water and port wine, barley-water, jelly, or beef-tea. Custard pudding at mid-day, and tea in evening. Nutrient suppositories discontinued. May 24th.—Feeding exactly the same. Total in twenty-four hours: Beef-tea, fourteen ounces; eggs, two; port wine, one ounce; Benger's food, nine ounces; barley-water, twenty-four ounces; custard pudding, four ounces, and jelly two; brandy, one drachm. May 25th.—Food still given every two hours, now in six-ounce doses. Peptonised milk given. Good motion after a simple enema. May 26th.—Food as before; no limit as to quantity. May 27th.—Diet unchanged; quantity increased. May 29th.—Steamed sole and mashed potatoes for dinner, followed by custard pudding; diet otherwise the same. May 30th.—Similar diet, with addition of boiled egg and bread and butter for tea. May 31st.—Similar diet; chicken, mashed potatoes, and brandy (half an ounce) added. June 2nd.—Chicken for dinner and fish for supper. Patient not disturbed at night to take nourishment. Bowels opened on alternate days by simple enema. June 3rd.—Got up on couch.

Pylorectomy case.—Gastro-jejunostomy, July 7th. Teaspoonfuls of hot water by the mouth; nutrient enemata and nutrient suppositories every four hours alternately. July 8th.—Five ounces hot water and five ounces of milk given by mouth during the

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day. Nutrient feeding continued. July 9th.—Ten ounces of milk and ten ounces of hot water by mouth. July 10th.—Same diet. Bowels opened with simple enema. July 11th.—Barley-water or beef-tea, or milk and barley-water, to be given in three-ounce doses every two hours; custard pudding also given. July 12th.—The same diet. July 13th.—Double the above amount given. July 14th.—An egg was added to the dietary. July 15th.—Two eggs were added. July 16th.—Milk and barley-water and beef-tea were given without limit, and minced chicken and beef jelly were added. This was continued till July 25th, when pylorectomy was performed. Only hot water in teaspoonfuls was given during the day, but nutrient enemata and suppositories were given alternately every four hours. On July 26th the nutrient feeding was continued, and ten ounces of barley-water, and ten ounces of beef-tea were given every two hours during the twenty-four hours, in half-ounce doses. July 27th.—This quantity of food was doubled. July 28th.—The nutrient enemata were stopped, and the quantity of food by the mouth again doubled, and three ounces given at a time; an egg was also given. The bowels were opened by a simple enema. July 29th.—The same diet was given, with the addition of milk and custard pudding. Nutrient suppositories were discontinued. The diet was continued unaltered till August 4th, when minced chicken and bread and butter were added. On August 11th the patient was put on ordinary hospital diet. Discharged August 29th.

The diet after an operation done for relief of a gastric ulcer requires some modification. We have here to remember that besides the clean wound in the stomach, which has been completely closed with sutures, and is quite secure at the end of forty-eight hours, we have to deal with an unhealed ulcer in the stomach. In such cases as operation for ruptured gastric ulcer, or of gastro-enterostomy for the relief of hæmorrhage, or for the cure of intractable gastric ulcer, nothing should be given by the mouth except stimulants for the first four or five days, the patient's strength being maintained by rectal alimentation. If no untoward signs have occurred at the end of five days, nourishment by the mouth may be commenced; in the meantime, however, there is no objection to the patient having a measured quantity (one or two ounces at a time) of water or tea at intervals by the mouth. Alcoholic stimulants in most cases are not desirable, and if necessary are better given by the rectum; and their place may well be taken by hypodermic injections of strychnine, or by infusions of saline solution.

It will be interesting to briefly refer to methods of feeding serious stomach cases recommended by other surgeons. MM. Terrier and Hartman's directions are as follows:—The subcutaneous injection of saline solution is to be carried out during the first twenty-four hours, and longer if necessary, and in severe cases it is continued for five days, from 600 to 2000 grammes being injected each day. Nutrient enemata are given for the first twenty-four hours, and in severe cases for as long as twelve days. If there be no sickness on the day after the operation the patient can have champagne or brandy and water by the mouth; they give peptones and milk on the fourth or fifth day, then eggs, and on the seventh day calves' brains, after which fish or chicken is allowed.

Bilroth gave hot water by the mouth; and enemata of warm wine, or of milk, or of peptones for the first two days; after two or three days milk, brandy, tea, and rum were given by the mouth. On the eighth day he gave calves' brains; after this eggs and hashed meat.

Heinke gives nutrient enemata for the first four days, but on the second day gives tea and *eau sucrée* by the mouth. On the third day he gives small quantities of milk and *eau sucrée*, on the fifth day cupfuls of milk and meat juice, and on the seventh or eighth day soups, roast meat, or hashes.

Nillard on the day of the operation gives small quantities of liquid, such as teaspoonfuls of coffee, and on the next day he allows milk mixed with water, tea, coffee, or beef-tea, still in small doses.

(To be concluded.)

We have received from the Abbey Effervescent Salt Company a specimen of their salt. The product is a high-class therapeutical preparation of excellent manufacture. Its pharmacodynamical value observed when the salt is administered in the acute and chronic forms of the various affections influencing absorption and excretion, is more especially seen when dealing with those complex phenomena of disordered metabolism so often occurring in connection with the so-called diatheses, which experience shows are only of temporary duration provided the normal conditions are restored.

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JAUNDICE IN CHILDREN.

A Lecture delivered at the Hospital for Sick Children, Great Ormond Street,

By GEORGE F. STILL, M.A., M.D., M.R.C.P.

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GENTLEMEN,—I propose this afternoon to make some remarks upon the significance of jaundice in children, and I shall consider this symptom chiefly with reference to prognosis. It is a matter of some practical importance to recognise the different conditions under which jaundice may occur, for while in many cases it is merely a symptom of some slight and transient disorder, in others it has the gravest possible significance.

The commonest condition in which jaundice occurs is that known as icterus neonatorum. This occurs in a large proportion, variously estimated at 30 to 80 per cent., of all infants. It is hardly necessary for me to describe this condition; the jaundice, as you know, appears almost always within the first week, usually on the third or fourth day. It is seen first on the trunk and face, then on the limbs and conjunctivæ; the urine and fæces remain normal in the milder cases. The child's health does not suffer in any way, and after four or five days, or at most one or two weeks, the jaundice disappears. Such is the ordinary course of icterus neonatorum, and you will find that writers on the subject mention two weeks as the limit of duration in the most severe cases.

I should like, however, to draw your attention to certain cases in which, instead of lasting a few days, the jaundice lasts as long as two months or even more, and then passes off, leaving the infant apparently none the worse for it.

Some of you have seen an infant who was recently under my care as an out-patient here, a boy who was brought for jaundice at the age of twenty-nine days with a history that the yellow colour had been noticed first on the fourth day after birth, and that, except for occasional vomit-

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ing and screaming after food, the infant was in good health. The urine was said to be "very dark," but the stools were often green, and once at least when I saw them were of a good yellow colour. There was nothing either in the child or in its parents to suggest the possibility of syphilis. The infant was well nourished; the liver was little if at all enlarged, and certainly not hard; the spleen could not be felt. The jaundice was not very intense, but was well marked both on the skin and conjunctivæ. It persisted for nine and a half weeks altogether, gradually disappearing, and leaving the child in apparently good health, except for some flatulence.

Another infant was brought to my out-patients with so-called splenic anæmia at the age of nineteen months. The mother told me that the child was jaundiced for eight weeks after birth (one could not be certain of the facts in this case, as the mother's memory may have been at fault).

It is impossible to say what is the explanation of these prolonged cases of icterus neonatorum, but clinically, at any rate, one may group them provisionally with the commoner cases of one or two weeks' duration, remembering that the nature even of the common condition is uncertain. The importance of recognising the occurrence of these prolonged cases lies chiefly in the matter of prognosis, for when an infant shows jaundice within a few days after birth, and the jaundice persists more than three weeks, one's tendency is to think of syphilitic hepatitis, or of congenital obliteration of the bile-ducts, in either of which conditions the prognosis would be extremely bad; but bearing in mind these unusual cases in which the jaundice passes off after two months or even longer without ill-effect, one must examine such infants very carefully before giving prognosis.

In the first case which I mentioned there were certain points which had to be taken into account:—the jaundice was not the intense yellow of the cases with congenital obliteration of ducts; moreover, there was not the enlargement of liver and spleen, nor the hardness of the liver which characterises the obliterative cases; the apparently normal size of the liver and spleen was also opposed to a syphilitic lesion, and the presence of bile in the stools showed that at any rate there was no complete obstruction of the ducts.

I felt by no means certain of the prognosis in this case, but the event has shown that it was altogether favourable so far as the present is concerned.

I say advisedly "so far as the present is concerned," for I think more observation is needed before we can make any general statement as to the future of such cases. My own experience leads me to regard them with suspicion. It may be that this unusual prolongation of jaundice, although it passes off apparently as innocently as in the ordinary cases of short duration, has, nevertheless, some sinister significance. In the second case the infant was brought several months after the jaundice had disappeared for so-called "splenic anæmia," and I would remind you that this splenic anæmia of infants is certainly in some cases associated with changes in the liver, and is also undoubtedly sometimes associated with congenital syphilis.

In this connection I should like to mention a third case in which there was a history of prolonged icterus neonatorum. This was a boy who had jaundice lasting six weeks from the time of birth; the jaundice then passed off, leaving the boy apparently perfectly healthy. At the age of two years and three months, however, jaundice again appeared; it lasted several weeks, and ended fatally. I made a microscopical examination of the liver, which showed advanced intercellular cirrhosis, which strongly suggested congenital syphilis, although there was no other evidence of it.

I shall not enter into the vexed question of the ætiology of icterus neonatorum here, except to say that, in my opinion, there is little doubt that in most of the cases, if not in all, the jaundice is not only hepatogenous, but is also obstructive.

I do not mean that there is necessarily any gross obstruction in the larger bile-ducts; but when we remember that the bile is secreted at very low pressure, it is easy to understand that a very slight increase in viscidity of the bile, especially in the smaller ducts, might cause sufficient obstruction to produce jaundice.

If the bile secreted during the later months of intra-uterine life is particularly viscid, one could well understand that with the sudden increase in the secretion of bile which presumably occurs when the child begins to take food after birth, and probably even before food is taken, the diffi-

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culty of exit, owing to viscid bile already in the ducts, may cause re-absorption of some of the newly-secreted bile into the circulation. And there is some evidence that the bile, both in intra-uterine life and in very early infancy, is apt to be very viscid. This I have myself observed at autopsies, and as I have elsewhere pointed out, the tendency to formation of biliary concretions which seems to be present in intra-uterine life, probably points in the same direction. In some cases of icterus neonatorum extreme viscidity of the bile has been demonstrated post mortem. In one infant who died with jaundice at the age of fourteen days I found this viscidity marked, and in another case, which died at the age of four weeks, when the jaundice was disappearing, I have noted the contents of the gall-bladder as "extremely viscid." In an infant who died at the age of four weeks with pyæmia and jaundice I found the bile so thick that it could scarcely be squeezed through the common duct with considerable force.

I have alluded above to biliary concretions or calculi. These are extremely rare, it has even been stated that they never occur, in children; but cases have been observed, and curiously enough they appear to be commoner in infancy than at any other period of childhood. Of twenty-three cases which I collected,* including three cases which came under my own observation, fifteen were in infants, and fourteen of these were in infants under ten months of age. In several of these infants there was intense jaundice at birth or shortly afterwards, and calculi were found in the ducts.

In one of my own cases minute calculi were found impacted in the common duct in an infant aged nine months, but there had been no jaundice.

I mention this very rare occurrence as indicating a tendency to stagnation of bile at this age, and as just worth remembering in connection with some of those cases of icterus neonatorum which run an unusual course.

Congenital syphilis, as I have suggested, may possibly be a factor in some of the prolonged cases of jaundice in infants who recover, but even temporary recovery, with complete intermission of symptoms, is probably quite unusual in the jaundice of the new-born with congenital syphilis. The usual course in syphilitic infants is steadily downwards; the jaundice is present at birth, it persists, and may be very intense. Hæmorrhage may occur in the skin or from mucous membranes, and after a few weeks the infant dies.

The presence of deep jaundice at birth is, I think, a point of some value in distinguishing these cases from the simple icterus neonatorum, but I should not care to lay any great stress upon it, for I have seen jaundice almost certainly due to syphilis, and ending fatally, which did not begin until eight weeks old.

Syphilitic hepatitis, however, is not the only cause of jaundice which ends fatally in congenital syphilis; some of the cases of pyæmic jaundice in infants are indirectly due to syphilis. Acute epiphysitis, which is a very early manifestation of congenital syphilis, may become suppurative, owing to a secondary infection with pyogenic micro-organisms; in this way a pyæmia may be started which may give rise to pyæmic jaundice. In two, probably syphilitic, infants which I examined post mortem, this appeared to be the sequence of events.

This pyæmic jaundice, whether it is secondary to syphilis, or due directly to umbilical infection, almost invariably ends fatally.

There is another group of cases of jaundice in infancy in which the prognosis is always bad; I mean those with congenital obliteration of the bile-ducts. It is by no means always easy to distinguish these cases from those due to syphilis, for in both the jaundice may be present from birth; it becomes very intense, and is associated frequently with hæmorrhages; the liver and spleen are enlarged and too firm; the infant wastes and dies.

One might have expected that with such a malformation of the bile-ducts jaundice would necessarily have been present at birth, but in forty out of the series of fifty cases collected by Dr. John Thomson this point was specially mentioned, and only nine showed jaundice at birth. Three cases of this kind have come under my observation, and were examined post mortem. None of them had shown jaundice at birth; in one of them the jaundice had not appeared until three weeks after birth, although autopsy showed that the gall-bladder and ducts were completely absent, being represented

* 'Path. Soc. Trans.,' vol. l.

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only by fibrous tissue. In the cases which I have seen the liver has seemed much harder on clinical examination than in the syphilitic cases, and corresponding with this, post mortem, the liver showed more advanced cirrhosis than I have found in cases of congenital syphilis. This may, however, be due to their longer duration, for whilst many of the cases with congenital syphilis die within a few weeks, the cases with congenital obliteration of ducts often live as long as four or five months. Two of the series mentioned above lived "into the eighth month," and one of the cases which I examined post mortem died at the age of nine and a half months.

An interesting point which I may mention here is the occurrence of severe jaundice in several infants of the same family. This has been noticed in cases of congenital obliteration of the bile-ducts. Dr. J. Thomson, in his valuable monograph on that subject, mentions two instances in which the malformation was found, post mortem, in more than one infant of the same family. But it is not only with this condition that several infants of a family may suffer with jaundice. In one autopsy which I made on an infant who died at the age of fourteen days with jaundice, there was nothing obviously abnormal in the liver or ducts, nor was there any appearance of cirrhosis (unfortunately no microscopic examination was made). Four other children in that family were said to have had jaundice lasting four to six weeks after birth, but none of them had died. There was nothing in the history to suggest syphilis in the parents; but some such cases are certainly syphilitic. Henoch records fatal jaundice in an infant whose mother had syphilis; three other children in the family had been jaundiced at birth, and had died soon after. Dr. Thomson (loc. cit.) also refers to cases in which several children of one family died with jaundice, perhaps the most notable being one recorded by Underwood, in which the first nine infants of the family died with jaundice under one month old, and the tenth died, aged six years, with jaundice also.

In children beyond the age of infancy jaundice is most commonly catarrhal in origin. So far as my own experience goes this catarrhal jaundice would seem to be most common between the ages of two and six years. Almost always the child has been ailing for some days before the jaundice appears, feeling languid, and sometimes drowsy. Often the child is cross and fretful, the appetite is bad, and almost invariably there is something abnormal in the state of the bowels; in some there has been diarrhœa, in others constipation, in others only offensive stools. Vomiting commonly precedes or accompanies the appearance of the jaundice. The urine quickly becomes darkened, and the fæces become pale. In many cases there is pain in the epigastrium and right hypochondrium, and this may be a marked symptom. In a boy who was brought to my out-patients' a few days ago with only slight jaundice, the pain in the abdomen was so severe that I felt doubtful whether the case was really one of catarrhal jaundice only; the subsequent course of the case seems to show that it was so. The liver was also apparently very tender in this boy and, as in many cases of catarrhal jaundice, could be felt about one and a quarter inches below the costal margin; one can sometimes easily detect a gradual diminution of the size of the liver as the jaundice passes off. The temperature in this case was raised to 101·6°; a slight rise of temperature is not uncommon at the commencement of the illness.

It is customary in text-books of general medicine to mention slowness of the pulse and itching of the skin as symptoms of catarrhal jaundice, but neither of these symptoms is common in children. The most marked slowing of the pulse which I have noted was in a child of eleven and a half years, in whom the rate fell to 56 per minute. Itching I do not remember to have observed in any case of jaundice in a child.

As a rule such jaundice passes off in about ten days or a fortnight, but I have seen cases in which it has lasted much longer; for example, in one it lasted about seven weeks, in another it lasted fully twelve weeks, so that some caution is needed in prognosis.

In this connection, also, I should like to draw attention to the recurrence of jaundice at short intervals in some children. A boy aged eight and three quarter years was brought to my out-patients with the history that two years ago he had jaundice; since then he has had seven or eight attacks of jaundice. For a short time before each attack he becomes very drowsy, so much so that the mother says she can tell beforehand when the jaundice is coming; the attack is associated with vomiting

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and pain in the abdomen. In another case an attack of jaundice, apparently catarrhal, lasted fourteen days, then the child remained well for six weeks, after which another attack of jaundice came on, and lasted a fortnight.

It is, of course, possible that such cases in children may occasionally be due to biliary calculi, but, as I have already pointed out, these are extremely rare in childhood. I have elsewhere (loc. cit.) recorded the case of a boy aged ten years, who, during an attack of severe abdominal pain with vomiting and jaundice, showed a fluctuating tumour in the position of the gall-bladder. He was then under the care of Dr. Barlow. The tumour suddenly subsided, and the jaundice passed off. I saw the boy six years later, at the age of ten years. The mother then stated that since the original illness he had suffered with repeated attacks of abdominal pain, in which he became of a "sallow colour." It was suggested that these were possibly due to biliary colic, but in both the cases mentioned above I was inclined to regard the attacks as recurring catarrhal jaundice.

One must always remember that there are other more serious causes of jaundice in children beyond the age of infancy, and the one which is perhaps most often overlooked, because unexpected in childhood, is cirrhosis. I am not referring here to the intercellular cirrhosis of syphilis, but to that form of cirrhosis which in an adult is almost always attributed to the drinking of alcohol. I cannot enter into the large subject of cirrhosis in children at the present time, but you will see from the specimens which I show you the kind of cirrhosis I mean, the very irregular surface of the liver studded with large "hob-nail" projections, and on section bright yellow rounded areas embedded in a stroma of grey fibrous tissue. At first sight the greyish fibrous portion looks more like the liver-substance than do the bright yellow areas, which almost suggest new growths in the substance of the liver, although microscopic examination shows them to be only the remains of hepatic lobules. The jaundice in such cases is generally very slight; indeed, there may be no jaundice at all. The striking feature of these cases is rather the great enlargement of the spleen, and given a child with slight jaundice, a very large spleen, and a tendency to epistaxis or other hæmorrhages, one has sufficient grounds for suspecting cirrhosis. If in addition the liver can be felt—and I would remind you that the liver may not be easily felt in these cases,—its hardness and irregularity of surface may clinch the diagnosis.

The children who come under observation with this condition are generally between the ages of four and thirteen years, and in most cases probably there is a fatal result within two or three years from the appearance of the first symptoms.

I may perhaps point out that you must not expect to obtain a history of alcoholism in these cases of cirrhosis in childhood; a few of them, undoubtedly, are due to the giving of beer and spirits, not necessarily in large doses; but it seems likely that in many, if not in most cases, there is no connection whatever with alcohol. Certainly you will fail to obtain any history of it, and such failure must not affect the diagnosis.

Amongst my notes I find several cases of jaundice occurring in children as a complication of various conditions, such as heart disease, pneumonia, tuberculosis, etc. It is an important question in connection with such cases whether the supervention of jaundice in any way influences the prognosis. One of the commonest associations is jaundice with heart disease, and so far as my experience goes, this occurs usually in the more advanced cases of cardiac disease, and I think one's tendency is to regard the supervention of jaundice as usually "the beginning of the end;" but this is certainly not always so. I have at present under observation a girl aged thirteen, who three and a half years ago was in the hospital with very severe mitral incompetence, a greatly enlarged heart, and probably adherent pericardium. There was considerable œdema, and when jaundice appeared one might very reasonably have thought that the case was near its end; but at the present time, three and a half years later, the child is much better, with no œdema, and able to walk about taking life easily. I have seen other similar cases in which, in spite of temporary jaundice, the heart condition improved under treatment, and the children were relieved, at any rate temporarily.

Both in pneumonia and tuberculosis jaundice is a symptom of very grave significance.

Time fails me to mention all the conditions under which jaundice is seen in childhood; for

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instance, I have made no mention of such a rare disease as acute yellow atrophy, which, nevertheless, has been seen in children with the same symptoms as in adults. I have ventured rather to give you such facts as have come within the ken of my own experience, hoping that they may be of some value, if only by emphasising the difficulty which there may be in determining the cause, and therewith the prognosis of jaundice in a child.

Appendicitis and Pregnancy.—A. Herrgott reports two cases of appendicitis during pregnancy, which terminated fatally in spite of operative interference. He holds that operation is demanded not only for all cases of appendicitis during pregnancy, but also upon all women having appendicitis who are susceptible of becoming pregnant. During labour the adhesions limiting the process are broken, infection becomes general, and the condition for treatment becomes very unfavourable.—*American Journ. of Obstet.*, Feb., 1901.

Asthma and Pregnancy.—Asthma may occur, says Audebert, for the first time during pregnancy. In some cases it may occur only during gestation, and sometimes in successive pregnancies. He cites an instance in which he diagnosed a three-months' pregnancy in a 4-para who was nursing and not menstruating, being led to this conclusion by a sudden attack of asthma. In such cases he regards the occurrence of such paroxysms as a true sign of pregnancy. He makes no attempt to account for the ætiological relationship of the pregnant state to asthma. If the disease antedates gestation it becomes aggravated. At the time of labour its symptoms are much more severe and dangerous, or may be absent. The mother may die (one case in seven); the fœtus suffers somewhat. Fœtal motions may be slow or not present for a time. In one case absence of fœtal heart-sounds for a day was noticed; subsequently they were feeble, and ceased soon after birth. The dyspnea never causes uterine contraction, but it is itself increased by labour. The writer advises morphine and local revulsion as treatment; quinine, if the case is one of hay fever. Induction of labour is indicated, especially in the interest of the child, if the attacks are severe and repeated. During an interval rapid digital dilatation, followed by rapid extraction by forceps or version, is preferable.—*Ibid.*

TWO LECTURES ON IMMUNITY.

Delivered at Guy's Hospital Public Health Laboratory,

By WALTER C. C. PAKES, D.P.H.Camb.

I.

GENTLEMEN,—I want to-day to say something about Susceptibility and Immunity. The term susceptibility is in reality the converse of immunity, susceptibility meaning an absence of immunity, and immunity in-susceptibility. But there is no such thing as absolute susceptibility or absolute immunity.

Immunity is of several kinds. In the first place, an immunity is a natural one or an acquired one. You can divide acquired immunity into active and passive, according to the manner in which it is produced.

First as to natural immunity. This immunity is shared by certain species or certain races, or is formed under certain conditions by certain individuals. In the first place there is the immunity of the *species*. Man belongs to animals of one class: cattle, horses, sheep, guinea-pigs, rabbits, and so on, belong to the other classes, and each of these classes as a race may be said to be immune from certain diseases. In the case of man we know that he is liable to certain diseases, such as cholera and typhoid, which liability is not shared by the lower animals. On the other hand, man is quite immune, in the ordinary course, from such a disease as symptomatic anthrax, a disease which is very fatal in cattle. Again, we have swine plague, which is common in swine, and in them is a very virulent disease; but it is a disease from which man is quite immune. We have in field mice and in rabbits such a disease as septicæmia hæmorrhagica, which is shared by only a few of these animals, other animals not being susceptible. When I say that certain of the lower animals are not susceptible to, or are immune from a certain disease, such as cholera or typhoid, that has to be taken with a certain amount of reservation; because we know that the organisms which produce these diseases are really pathogenic to certain of our laboratory animals. We must therefore draw a distinction, in the first place, between a disease which is acquired in a natural manner, and one which is acquired in an artificial manner. Man,

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as I have already said, is susceptible to typhoid and cholera, whereas the lower animals are not susceptible to these diseases, and hitherto practically all attempts to convey cholera or typhoid to the lower animals by ordinary natural methods have failed. But if you inoculate, that is to say, if you get the virus or the bacilli into the body under certain abnormal conditions, the animals may suffer from, not the disease, but certain symptoms which are characteristic in some measure of the disease. To give you an example:—The guinea-pig is not susceptible to diphtheria, whereas man is. But if you inject into the subcutaneous tissue of the guinea-pig a pure cultivation of the diphtheria bacillus, this guinea-pig will die, not of diphtheria as we understand it, but of the cardiac failure and paralysis which is so often a typical picture of ordinary human diphtheria. Then, such animals as man and the horse acquire tetanus in more or less the ordinary way, but fowls and other animals do not get tetanus except when artificially inoculated in the abnormal manner which I have described. So much for the immunity which belongs to species.

Next we have the immunity which belongs to a particular *race*, and as examples of this we find anthrax. Although this organism is very virulent for ordinary sheep, for some reason it fails to attack Angora sheep. The reason of this I shall attempt to discuss later on. Another example is that ordinary rats are susceptible to anthrax, whereas white rats are quite immune, with the reservations I have already made.

Then we have what I have called conditional immunity. The fowl, in the ordinary course of events, and even in the abnormal course of inoculation, is not susceptible to pneumococcus, that is to say, there is not such a septicæmia as rabbits or man get. But if you put this fowl under certain abnormal conditions, conditions which reduce its natural power against the organism, you will be able to produce symptoms in that fowl. One of the methods is to cool the fowl some degrees below its normal temperature. On the other hand, you can inoculate a frog with anthrax and yet it will be practically unaffected by the organism. But if you put the frog under conditions which are very abnormal, such as putting it into a temperature five or six degrees above its normal temperature, you can produce symptoms, and perhaps death, with a cultivation of anthrax which is no more virulent than that which fails to affect it under ordinary normal conditions.

Finally, there is the natural immunity which belongs to the *individual*, and this is by far the most difficult to understand, and almost impossible to explain. That this individual immunity does exist is obvious to anyone who has made experiments with animals. As an example:—The rabbit is very susceptible to the pneumococcus, and if you have a strain of pneumococcus which is very virulent, you will be able to kill practically every rabbit if you give a sufficiently large dose. But if you are attempting to raise the virulence of the pneumococcus, and you have it, as you think, at such a pitch that a whole agar culture will kill a kilogram weight of rabbit in twenty-four hours, in your series of experiments you will come across rabbits which are not only unaffected by this dose, but you will succeed, very often, in losing your cultivation. In other words, you have a series of rabbits, and when the virulence of your bacillus reaches a certain point it ought to kill every rabbit as a race; but for some reason or other there are individual rabbits which, although the virulence of the organism is increasing, will be unaffected. In other words, the immunity of that rabbit is above the line of the virulence of that organism. You will understand that better when I reduce it to a numerical standard, as I shall soon. The history of all human epidemic and practically all endemic diseases, shows that this is also the case with man. One knows that there are family predispositions, family susceptibilities, to certain diseases. We know how the Royal family seems particularly susceptible to typhoid. But there is the converse of that; in any community you will always find that, however extensive the epidemic may happen to be; whether it be one of typhoid, smallpox, or influenza, cholera, or diphtheria, there are persons who, though they are subjected to exactly the same conditions, as far as one can see, as those who have taken it, and who may be in attendance on the sick and may not be enjoying the best of health, do not get the disease. This is very difficult of explanation; but there is no doubt that it does happen. At the commencement of epidemic diseases it is well known that the first cases are often mild ones. When you have mild cases you have a number of persons who must have been

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very susceptible to the disease. Until later in the epidemic quite a minor fraction of the population is infected; but as the epidemic increases in virulence it also increases as regards the number of persons who are infected. But, however widespread the epidemic may be, there will always be a certain remainder of the population who will never get the disease at all. We can in such a case only argue in a circle, and say the reason they do not get it is that they are naturally immune; but why that is so it is impossible yet to say.

I want to try and put this numerically, because I think it is easier to understand if we can put it into figures. When we are considering such a thing as infection we have two factors always at work. In these infectious diseases we have first of all the virus, that being generally a micro-organism, often a bacterium; and secondly, the immunity of the individual. Suppose we put the question of immunity as a matter of dosage. Let us take the pneumococcus, there is what Washbourn and Eyre call a standard virulence. This standard virulence is the greatest possible virulence which any organism can acquire with regard to any particular race of animal. Beyond this it is impossible to get. If you introduce twenty pneumococci of such standard virulence into one kilogram of rabbit, that rabbit will die (provided it is not one of those few exceptions which I have mentioned). Therefore the number of bacteria of standard virulence which are required to kill an animal, we will say, is twenty. Supposing, now, we take this same pneumococcus, and cultivate it artificially until its virulence has gone down, we shall require a great many more than twenty to kill our rabbit. Let us call the virulence of this pneumococcus twenty; twenty of these form a lethal dose. By multiplying the virulence by the number we get 400, and this we may term the "requisite" dose, or the "immunity figure." Supposing we have a pneumococcus which has a virulence of 1, we shall want 400 of these in order to kill the same rabbit, because the rabbit has an immunity figure of 400.

Let us apply this to enteric fever, both endemic and epidemic. We have a number of people whose immunity figures vary from, let us say, 30 up to 800. (We must assume some such figure as 30, because we have previously found that there is no such thing as absolute susceptibility.) During the inter-epidemic periods the typhoid bacillus has probably a low virulence; let us say it is represented by 2. A certain number of people drink water which is contaminated with these typhoid bacilli. Many imbibe only a few, others a fair number. Now if the lowest immunity figure of any of these people is 30, it is evident that even this one person must get 15 bacteria before he will acquire the disease. It must rarely happen that any person receives more than 15 or 20 typhoid bacilli, and consequently the requisite dose N V.* is less than the immunity figure enjoyed by most of the inhabitants. I think this is an explanation of the reason why, in certain years, a disease which is endemic in a certain spot does not become epidemic.

It is well known in diphtheria, for instance, that although certain populations are visited by epidemics in certain years, the inter-epidemic years may be never free from the disease. The reason is possibly because the diphtheria bacillus is so avirulent that it can only produce the disease in a small proportion of the population, because there is only a small number of the population which have a sufficiently low immunity figure to allow them to contract the disease unless they get a very large number of the avirulent bacilli. As an epidemic begins, and as an organism passes through the bodies of the patients who have the disease, the virulence increases. Therefore in order to produce the same effect a smaller number of bacteria is required. But of course you very often get an equal number with increased virulence. Suppose the virulence has increased from 2 to 10, the average number received being still 20, now it is evident that every one in the community who has a lower immunity figure than 200 will be liable to get the disease, and you find the epidemic is increasing. The virulence continues to increase to 20, which we can assume to be the maximum virulence for man (*i. e.* the standard virulence previously mentioned), so that all the people with a lower immunity figure than 400 will be now susceptible. But the virulence, by passing in the ordinary way through man, never acquires a higher degree than 20; and unless you get a greater dosage than 20 (which is probably rare), the epidemic will decline, because only the remainder of those under

* N is number of organisms, V is virulence, so that N V is the dosage.

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the 400 line can acquire the disease; all the others are immune. Every now and then some person who has been in contact with the diseased patients for some time acquires the disease. This is probably due to the fact that the dosage is very large. For instance, those who have been in attendance on sick people, who are not cognisant of the various disinfecting processes which should be adopted, or are careless, may get such a very large dose of virulent bacilli; so that, although their immunity figure is high, the requisite dose figure is higher—as an instance, a medical officer in attendance.

An explosive epidemic of enteric may be explained in a similar manner. A patient at a farmhouse has an attack of enteric, and the excreta contaminates the water in which the pails are washed. The virulence of the bacillus is, let us say, 8. The bacilli increase in the milk, so that we will assume that the number is 30. The dose is, therefore, represented by 240. All the people consuming the milk who have an immunity figure of less than 240 will, therefore, probably contract the disease; and, as the infection takes place on a certain day, those who contract the disease will fall ill within about seven days of one another—*i. e.* within the limits of the incubation period. If the contamination of the milk continues, the majority of the people will consume infected milk, and probably all those who are susceptible to the dose will fall ill.

The different incubation may be explained on similar lines. Assuming that a certain time must elapse between infection and illness, the actual time will depend upon the relation of the dose to the immunity figure. If two people with immunity figures of 60 and 180 respectively receive each a dose of 200, it seems obvious that the bacteria will have more difficulty in overcoming the immunity of 180 than 60, and therefore the incubation period will be longer. Or suppose that two persons, both having an immunity figure of 180, receive doses respectively of 200 and 400 the former will obviously present greater difficulties for the bacteria than the latter, and therefore the incubation period will be longer.

There is another natural immunity, one which is really incidental in a way. I refer to the immunity which is enjoyed by people who are of either one or the other sex, or who are at a certain age. You know in the history of all these diseases there is said to be an "age incidence" or a "sex incidence." There are people who are more susceptible than others because of their age. Diphtheria is a disease which is particularly liable to attack young children of either sex. Carcinoma is a disease which apparently attacks only those over thirty-five years of age,—that is to say in the prime of life, or at ages past the prime. Another example is typhoid fever, which is essentially a disease of young adult life. The chance of getting typhoid fever after twenty-five years of age becomes less and less with each year of life. Then, again, with regard to such a disease as smallpox the immunity during the first six or twelve months of life is very marked. Very few children get smallpox within the first six months of life. After that time, for some reason or other, the susceptibility goes up very considerably, and they become more and more susceptible until they get further on in life, after which again they become less susceptible.

Immunity is also, as I have said, acquired, and the acquired immunity may be either active or passive. The remarks I shall now make apply to what we call active immunity. A susceptible person may acquire active immunity against certain diseases in one of several ways. One of these is by *having contracted and recovered from the disease itself.* Syphilis, smallpox, typhoid, scarlet fever, measles, and several other diseases, really confer upon the patient a subsequent immunity. But this immunity is not absolute, because cases are recorded in connection with every one of these diseases where patients have suffered from a second attack. As far as I remember syphilis is the most rare of these, but Mr. Jonathan Hutchinson has published cases which he has been satisfied were second attacks of primary syphilis. Perhaps next to syphilis comes smallpox, but again, cases of second attacks of smallpox are by no means unknown. As we get down the list, and take scarlet fever, measles, chicken-pox, and so on, the numbers of recurrences become more frequent. But although the immunity in these diseases is neither absolute nor interminable, it lasts for a considerable length of time. It is very rare to find a second attack of scarlet fever or smallpox within fifteen to twenty years. At the other end of the scale we have diseases which confer a short immunity, diseases which until

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recently were thought not to confer immunity, but susceptibility. This probably is not the case, but what happens is that there is an immunity acquired by having the disease, but the immunity is of short duration; it does not, however, leave the patient susceptible, but leaves him exactly *in statu quo*. Of these diseases influenza is most notorious; but such diseases as diphtheria, and such a protozoic disease as malaria, are well-known examples also. This we may call the natural manner of acquiring immunity, immunity derived from contracting the disease itself.

There are also certain artificial means by which immunity can be either acquired or conferred. This can be done, as you know, with some of those diseases of which we know the cause, such as typhoid, cholera, and plague; and it has also been done with very marked success by M. Pasteur in that disease of which we do not yet know the cause, namely, hydrophobia. As we cannot say much about the organism of hydrophobia, I think it may be best to take one that we really know is produced by a certain micro-organism, namely, anthrax. This is a classical bacillus, on account of its having priority. If you inoculate certain animals with anthrax they will die. Pasteur found that if he kept the cultures of this bacillus in the laboratory for some considerable time, a larger dose of it was required in order to kill the animal; in other words, the cultures had become attenuated, or had lost virulence. If you attenuate the organism sufficiently, you will be able to give symptoms of the disease, but the animal will be able to recover. This attenuation of the culture may be accomplished in several ways. One of the best-known ways is to attenuate it by passing it through the body of another species of animal. It is well known now that with certain micro-organisms, such as that of bovine anthrax, the passage of this organism through guinea-pigs increases the virulence for the guinea-pig, but decreases it for cattle. Another example of the same thing is that swine plague, when passed through rabbits, acquires a very much greater virulence for rabbits, but it becomes very considerably attenuated for the swine. Pasteur found that in the case of hydrophobia, if the virus was passed through a series of monkeys it declined in virulence as regards dogs, but if passed through a series of guinea-pigs it increases in virulence as regards dogs. So you can alter the virulence of the virus by its passage through other animals. And this we know is what happens in the case of vaccination. What is smallpox in man is cow-pox in the cow, and by the passage of virulent smallpox virus through the cow you can get a virus which is attenuated for man, and which now, when inoculated into man does not produce the true disease, but a modified disease which we call vaccinia.

A second method of producing this attenuation is by putting the virus or the bacilli under conditions which are somewhat inimical. Pasteur found that if he kept dry the cords of rabbits which had been inoculated with hydrophobia, after the lapse of a certain number of days the virulence decreased, and practically in proportion to the number of days that the cord was kept dry. So that he could, by regulating his days, get a series of specimens of the virus decreasing considerably in virulence; that is to say, he could get a true series of attenuated cultures.

Another way is simply to grow the virulent organism on artificial media. One of the best examples of this is the pneumococcus. On artificial media this organism dies out quickly. If it is kept alive by constant passage through artificial media its virulence goes down with extreme rapidity. Ten to fifteen passages daily through broth will bring its virulence down so that a whole broth culture will not kill a rabbit. The same may be done with anthrax, with typhoid, with cholera, with diphtheria, and with practically all the pathogenic bacteria.

Another way is to grow the organisms at a temperature much below or some degrees above the normal body temperature. Diphtheria can be made avirulent by growing at 42° C. instead of 37° C.

Still another way is by putting them under conditions, apart from media, to which they are unused, such as by growing them in a weak antiseptic, or by passing a current of oxygen over the culture. One of the ways in which anthrax was attenuated originally was by growing it in a very weak solution of carbolic acid. To put it popularly, the organism has so much to think of in order to keep itself alive, that it forgets to look after its virulence. The latter method was adopted with anthrax, and also by Haffkine in the pre-

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paration of his cholera vaccine. These are the methods of procuring an attenuated virus.

In order to confer any notable immunity by means of an attenuated virus, one has to inoculate several times with the attenuated virus. I will give you one concrete example. The horse is susceptible to diphtheria. If you give it a fairly large dose of diphtheria it will be very ill, and may probably die; but if you attenuate the culture by one of the methods I have already mentioned, you will be able to inoculate a certain quantity of the attenuated cultures into the horse. It will probably get a local abscess, with a rise of temperature and *malaise*—if a horse has *malaise*,—but at the end of two or three days it will recover. By having inoculated the horse with this attenuated culture you have done something to him which will enable him to stand a larger dose of the same attenuated culture, or the same dose of a culture which is less attenuated. You therefore give him a second dose of either the one or the other, and again he gets a local reaction, which subsides in two or three days. Again you have increased his immunity. This is persisted in until a time comes when you can safely inject into the horse far more virulent bacilli than would kill a control horse; in other words, you have produced an immunity in that particular horse by the injection of attenuated cultures. This, as you see, is practically the same as giving a modified form of the disease, as in the case of vaccinia. We know that vaccinia protects from smallpox; and vaccinia is attenuated smallpox. We have attenuated our cultures of diphtheria by modifying our doses and our degree of attenuation, and we can produce an immunity in the horse which is so great that that horse will stand a dose sufficient to kill more than one control horse.

The next method of acquiring immunity is by injecting sublethal doses of virulent organism. I said it took twenty pneumococci to kill a susceptible rabbit. If you inject five pneumococci into an animal he should not die. After you have put five in, and he has got rid of them, you can put ten in, and he will get rid of them. Now you can put twenty in, and he will not die; that is to say, by putting in a sublethal dose, you have conferred upon him an immunity which, although at the moment low, is sufficient to protect him against the minimum fatal dose. If you gradually increase the number of pneumococci, you can eventually get a rabbit to such a degree of immunity that he will stand one hundred times a fatal dose; in other words, he will stand a dose which would be sufficient to kill a hundred control rabbits.

TREATMENT AFTER ABDOMINAL OPERATIONS.

A Post-Graduate Lecture delivered at the West London Hospital,

By L. A. BIDWELL, F.R.C.S.,

Senior Assistant Surgeon to the Hospital, and Dean of the Post-Graduate College.

(*Concluded from p.* 320.)

Stimulants.—In most cases stimulants will be required from the first day; it is usual to add some brandy (two drachms) to each nutrient enema on the day of the operation, and if the general condition of the patient is good no further stimulant will be required till the third or fourth day, when solids are given by the mouth, then a little champagne with the principal meal is indicated. In a case where there is considerable shock, however, stimulants must be pushed earlier, and in deciding upon this point, and also on the quantity to be given, I am guided by the pulse; a rapid pulse demands stimulants, and if necessary they may be pushed to a very large amount; thus, I have kept a patient alive for a month after a serious operation by giving each day sixteen ounces of brandy and eighteen ounces of champagne. Some surgeons, as a routine, commence on the evening of the operation by giving iced champagne or iced brandy and water; the former, however, does not seem to be desirable after an operation on the stomach, as it tends to distend the organ with gas. Brandy, therefore, is to be preferred, and for a similar reason should not be mixed with soda water; other stimulants given are rum, red wine, and beer. The last-named is very useful when the patient expresses a wish for it, since the malt which it contains is of some nutritive value. In France the stimulant is usually diluted with Vichy water, but this is not essential.

Management of bowels.—In abdominal operations, not only is it advisable to clear out the intestine thoroughly before the operation, but the

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bowels should not be allowed to become constipated after the operation. Especially when nutrient feeding is employed is it necessary to wash away the unabsorbed residue each day. In every abdominal case our wish is to prevent any stasis of the intestinal contents due to the temporary paralysis of peristaltic action by exposure, or the application of irritating antiseptics, and we must use every endeavour to re-establish the normal peristalsis as soon as possible.

At this point I should like to draw your attention to the condition known as pseudo-ileus, which is a form of intestinal obstruction brought about by paralysis of the gut from exposure or injury, and is often combined with the formation of adhesions in such a position as to cause a kink. The condition is naturally not common after operations on the stomach, as the lower part of the small intestine is seldom exposed; it is, however, fairly common in operations on the lower part of the abdomen. It has often been confused with peritonitis, and has led to the supposed cure of peritonitis by purgatives; there are, however, no signs of peritonitis post mortem in fatal cases. Pseudo-ileus differs also from other intestinal obstruction by its rapidly fatal course if unrelieved, death being probably due to the migration of the *Bacillus coli communis* from the paralysed gut into the peritoneal cavity, and by the absorption of its toxins therefrom. In order to guard against this condition, which arises from paralysis of the gut, as well as for other reasons, our aim must be to re-establish the normal peristaltic action as quickly as possible. The first means by which we attempt to do this is by the passage of a flatus tube about four or five inches up the rectum every four hours, immediately before each nutrient injection is given; this enables the gas to be expelled by the enfeebled peristaltic contraction, which would otherwise not have sufficient force to conquer the resistance of the anal sphincter; early feeding, too, will help our object, and hot fluids by the mouth, together with the avoidance of ice, and of milk, are more conducive to the production of peristaltic action than starvation and ice. The most important point, however, is to obtain an early action of the bowels by means of an enema. This should be given on the second or third day after the operation, and may contain some purgative drug in addition; a list of some of the purgative enemata is given below. Some surgeons recommend a purge as well—thus, Spencer gives calomel on the second day,—but I am inclined to rely first on the action of enemata, and to give a purge by the mouth only if the enemata are unsuccessful. In such a case I give two grains of calomel, followed by an ounce of Mist. Sennæ Co. or a pill containing calomel and colocynth, or an ounce of Mist. Mag. Carb. and Mag. Sulph., to be repeated every two hours. In cases where aperient medicine cannot be given by the mouth in consequence of vomiting, and no result has followed a simple enema, we must rely upon the use of purgative enemata, the most useful of which are the following:

(1) ℞. Ol. Ricini, turpentine āā 1 oz. in 10 oz. of thin gruel.

(2) The British pharmacopœia enema terebinthinæ, containing 1 oz. of turpentine to 15 oz. of mucilage of starch. Both these preparations, however, are rather strong, and I usually employ an enema of one pint of gruel containing ʒj to ʒij of turpentine.

(3) Enema sulphate of magnesia (or enema catharticum, B.P.): ℞ of sulphate of magnesia 1 oz., olive oil 1 oz., mucilage of starch 15 oz.

(4) Enema of aloes (B.P.). Aloes 40 grs., carbonate of potash 15 grs., mucilage of starch 10 oz.

(5) Enema of colocynth contains ext. colocynth ʒss, soft soap ʒj, water Oj.

(6) Enema of glycerine ʒj to ʒij injected undiluted, or in the form of a suppository. This latter, however, is not of much use immediately after an operation, and may cause tenesmus.

A good number of cases of operations on the stomach never require any aperient, and the bowels act naturally on the second or third day; in some cases also the other extreme is reached, and very troublesome diarrhœa follows, which has caused a fatal issue in several cases without leaving any signs at the post-mortem. In such cases the amount of liquids given should be diminished, and tincture of opium must be given by the mouth, and the stomach washed out; this will usually suffice to stop the diarrhœa.

Rectal feeding.—As some amount of rectal alimentation is required in most abdominal operations, and in nearly every one on the stomach, some account of the best form of carrying this out will be useful. In the first place, before commencing nutrient enemata it is best to thoroughly

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wash out the bowel with normal saline solution; this must be repeated each day to remove the *débris*. The patient should be lying on his back, and should not change his position for some time after the injection. The best method of introduction is to use a soft rubber rectal tube the size of a twelve or fourteen catheter, which should be passed about six inches up the rectum; connected with the tube is a funnel, which should be raised two feet above the bed. This is better than a syringe, since the fluid will flow more evenly and slowly into the rectum, and so is more likely to be retained; the risk of forcing in air, too, is diminished. The whole enema should not exceed six ounces in bulk, and in some irritable rectums only three or four ounces should be given; it should be of a temperature of 100° F., and should be given every four or six hours. Practically only substances in solution can be absorbed from the rectum, so unpeptonised milk or beef-tea are useless; stimulants, such as spirits, wine, tea, or coffee are most readily absorbed, but extractives and peptones are also of value. The necessity of giving digested meat has been recognised for a long time, but the process of preparing the enemata has been much improved by the introduction of the various peptonising and zyminising powders now on the market. The older enemata were prepared with fresh pancreas. The following are a few of the best:

(1) *Von Leube's.*—Five ounces of finely-scraped meat are chopped very fine, and to this is added one and a half ounces of finely-chopped pancreas; the whole is suspended in three ounces of lukewarm water, and stirred to the consistence of a thick pulp. This makes one injection.

(2) *Mayet.*—150 to 200 grammes of pancreas are bruised in a mortar with tepid water at a temperature of 100° F., and are then strained through a cloth; 400 to 500 grammes of lean meat are chopped fine, and the strained pancreatic fluid is mixed with the mince, together with the yolk of one egg. This is allowed to stand for two hours, and administered at the body temperature; the quantity is sufficient for twenty-four hours' nourishment, and should be administered in two parts.

(3) *Rennie's.*—Half a pound of lean meat is pulled into shreds and added to a pint of beef-tea; to this is added ʒj of fresh pepsin, and ʒss of dilute hydrochloric acid; the mixture is kept at a temperature of 99° F. for four hours, during which it is stirred constantly. If too great heat be employed the digestion will stop.

(4) The enema which *I* have been in the habit of using is made as follows:—Milk 2 oz., strong beef-tea 2 oz., yolk of egg 1, liq. pancreatin (Benger) ʒj. This is to be prepared one hour before use, and to be kept at a temperature of 100° F. One half to one ounce of brandy is added, when necessary immediately before use.

(5) *Terrier and Hartman* recommend the following:—Peptones 20 grammes (ʒj), infusion of tea 100 grammes (4 oz.), benzo-naphthol ½ centigramme, Tinct. Opii ♏v. Four of these are given during the twenty-four hours.

(6) *Greig Smith.*—One egg is beaten up in six ounces of milk, and two or three teaspoonfuls of meat jelly or peptones added. This is administered warm with or without half an ounce of brandy every five or six hours.

(7) *Hunter Robb's.*—Peptonised milk 1 oz., whisky ½ oz., the whites of two eggs, common table salt gr. xiv.

Nutrient suppositories are also used when the rectum is intolerant of injections, or they may advantageously be used alternately with them in cases requiring several days rectal feeding. If used alone they must be supplemented by an injection of about half a pint of hot saline solution once or twice a day. The suppositories are usually made of peptonised beef, a chocolate-coloured paste, which is prepared by digesting beef with acidified fresh gastric juice, and then concentrating the solution. The suppository contains thirty grains of this, and is stiffened with cacao butter. These suppositories are made by most wholesale chemists, and keep for only a short time after the box is opened. It is best to use them as freshly prepared as possible.

Lastly, *Sansom* has recommended the use of blood as an enema. Ox blood is usually employed, and must be defibrinated first; this can be got from a butcher by asking for whipped blood. It must be fresh, and will not keep more than one day. By the addition of one and a half grains of chloral to one ounce of blood all offensive odour is prevented. It is usual to inject two or three ounces of blood every two or three hours. Personally I have had no experience of the method, but its introducer reports favourably of it.

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In cases where rectal feeding has to be continued for any length of time, it is well to change the composition of the enemata, since the rectum does not appear to retain any one kind of enema after a time. If, too, the rectum be irritable, two or three minims of Tinct. Opii should be added to each enema. Some surgeons also add some disinfectant to each enema, either beta naphthol or salol; from two to five grains of each can be given. Alcohol also acts as a disinfectant, as well as a stimulant, so this is an additional reason for adding either brandy or red wine, as suggested by Ewald.

Lavage.—If vomiting and eructation continue after the second day, and especially if at the same time the temperature be elevated, the mouth dry, and the tongue sticky and coated, it is almost certain that there is some decomposition of the stomach contents. If these contents be allowed to remain in the stomach, they will probably produce a fatal issue, either by setting up diarrhœa, by keeping up vomiting, or by absorption of toxins. It is very important that they should be removed at once; to do this a stomach-tube must be passed, and the stomach thoroughly washed out with some antiseptic, such as salicylic acid, followed by plain boiled water, which must be continued until the fluid returned is quite clear. Feeding must be recommenced immediately after the lavage, as this will be a favourable time for the absorption of some nourishment. The lavage must be repeated on the next day if vomiting or eructation continue. In some cases it may require to be done daily for five or six days.

Some hesitation might be felt at passing a stomach-tube forty-eight hours after suture of the stomach, and injecting water to wash out its contents, since this might place a strain on the stitches; however, it is far better that a suture should undergo a slight strain than that it should be soaked in a putrid liquid; besides, the wound in the stomach is firmly sealed at the end of forty-eight hours, and will practically be as water-tight then as ever it will be. The lavage, of course, must be done gently, the patient lying on his back, and the fluid introduced by means of a funnel which must not be more than three feet above the patient's head; it is removed by syphon action, not by expression.

Mouth and teeth.—As in the preparation before an operation special attention was drawn to the importance of rendering the buccal cavity as aseptic as possible, so also after an operation on the stomach this point is still worthy of remark. The teeth should be gently brushed with some antiseptic tooth powder at least twice a day, commencing on the day after the operation, and the mouth rinsed out with boric solution, or with peroxide of hydrogen. All accumulation of food and sordes should be removed from the gums and teeth by means of a small piece of wool soaked in dilute carbolic or boric lotion. Attention to the state of the mouth is of importance not only in preventing decomposition of the stomach contents, with consequent vomiting and diarrhœa, in preventing septic broncho-pneumonia, which has been a fruitful cause of death after stomach operation, but also in preventing the formation of a parotid bubo which may lead to suppuration, and exhaust the patient's strength.

Position of patient.—As before stated, the patient need not lie flat in bed after stomach operations, especially after gastro-enterostomy, since the escape of contents out of the stomach is facilitated by the patient being slightly propped up. In some cases, too, turning on the right side also facilitates the outflow of stomach contents. It is unnecessary to state that the patient must not move himself, but must allow the nurses to change his position. This change of position also has an influence on the bowels, since it often relieves the condition known as pseudo-ileus, which has been already referred to.

In a simple uncomplicated case of abdominal section, the patient should be kept in bed for fourteen days, and may then be moved on to a couch; but he should not be allowed to walk until the end of three weeks; in hospital practice the patient usually leaves the hospital at the end of a month.

I have not made any mention of peritonitis, since it should never occur after any operations on the stomach with the exception of those for perforating gastric ulcer where it has existed before the operation. In any other operation it can only occur after faulty suturing, or where septic material has been introduced either by the surgeon's hands, instruments, ligatures, or sponges; in cases of operation for septic tubal abscesses, or for those connected with the vermiform appendix, peritonitis is a real danger, and may occur after imperfect

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cleansing of the cavity; it is best treated by thorough and prolonged drainage.

There are two other points which require notice; the first is the administration of morphia, and the second is the admission of visitors.

Many surgeons, like myself, have a great prejudice against the use of morphia hypodermically during the first days after an operation; it is never given with my consent until the bowels have been opened, on account of the bad effects which it often produces. These effects are persistent vomiting, and delay in the re-establishment of peristaltic action, and consequent pseudo-ileus and adhesions. Other surgeons, especially Spencer, to whom I have referred before, make a rule of giving morphia and atropine every three hours or so, so as to prevent vomiting; Maylard also recommends a hypodermic injection of one sixth to one quarter grain of morphia to be given and repeated if necessary; Villard, too, gives morphia, except in feeble patients, where stimulants are indicated in its place. It certainly has some depressing effect, and if it produces vomiting it takes away the only chance of recovery from a feeble patient. At any rate, I should never advise its use.

With regard to *visitors*, after any serious abdominal operation no one should be allowed to see the patient during the first forty-eight hours under any circumstances, except where the case is apparently hopeless. With an unexcitable patient the nearest relative, if a sensible person, may just see him for two or three minutes on the third day, and have a short talk on the following day; not more than one person at a time, however, should be admitted during the first week; at the end of a week visitors are a welcome change, and their presence can do nothing but good. A nervous, excitable patient, on the other hand, with excitable friends, had better be kept quite alone for at least four or five days, and then see very few visitors. During the first week the patient should not be left alone with a visitor friend, but the nurse should remain on guard. It is wonderful how apparently quite sensible people will attempt to give food to an operation case. At the hospital a patient's friend was caught giving plum cake to a case of gastro-enterostomy three days after the operation.

CONSULTATION ON A CASE OF TUMOUR OF THE NECK AT ST. GEORGE'S HOSPITAL.

MR. JAFFREY.—I am showing this girl aged twenty-one for Mr. Sheild. You see she has a very large swelling on the left side of the neck, and she had suffered from goitre ever since she was seven years of age. The swelling increased in size very slowly until eight months ago, when the rate of growth was rapid. It causes considerable aching in the shoulders and back. She has some tubercular trouble in one of her knee-joints, and there is a family history of tubercle. Mr. Sheild wants our opinion as to the advisability of removing one side of this tumour. The patient also complains of a sensation of choking, and shortness of breath on the least exertion.

MR. DENT.—I think it would be advisable to remove one side, but I must say I should try to improve the girl's condition before attacking it. She is excessively anæmic, and looks almost chlorotic. The reason I advise a month at Wimbledon or at the sea-side before operating, is that I think the tumour will be got away with very much less hæmorrhage than if it were attempted now, and there would be much less oozing. At the same time, I think it would be a comparatively simple affair to remove it. I should aim at enucleating the left side, ligaturing the isthmus if found necessary, though that, perhaps, may not be required. Of course I should satisfy myself that she is sound in other respects, and I assume she has no enlargement of the spleen.

MR. BENNETT.—I think a good deal in this matter depends upon the diagnosis. I have not been able to examine the case very carefully, but it is very suggestive of a thyroid full of adenomatous tumours. The central one over the region of the isthmus certainly feels like an adenoma, and if it is of that nature it simplifies the case; and also simplifies the operation, because if the case is one of multiple thyroid adenomata, I should not proceed to remove the left half of the thyroid, but should shell out the adenomata, which is, of course, a very much less severe matter than removing the left side of the gland. Removal of the whole of the left side of the thyroid in a girl so delicate as this would be a matter requiring

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serious consideration. Therefore, if I were dealing with this case, I should start with an open mind, and expose the left lobe of the thyroid, and I should, if I found it packed with adenomata, shell them out one by one, and then deal with that in the middle line. I should certainly not attempt to remove the left half of the thyroid *en masse*. If my impression about the adenomata proved to be wrong, I should then consider, whether having regard to the patient's condition, the whole of the left half of the gland should or should not be removed. It is well to bear in mind in cases of this kind that the ill effects resulting from pressure can generally be obviated by removal of the median tumour and free division of the structures down to the trachea in the middle line, if the major operation should for sufficient reasons seem undesirable.

REVIEW.

CHLOROFORM: A MANUAL FOR STUDENTS AND PRACTITIONERS. By EDWARD LAWRIE, M.B. Edin., M.R.C.S.Eng., Lieut.-Colonel, I.M.S., Residing Surgeon, Hyderabad. (London: A. and J. Churchill. Price 5*s*. Pp. 120.)

The really useful portion of this sumptuous book is contained in Part III, pp. 44 to 60. This sets forth lucidly the author's method of producing chloroform anæsthesia, which is far less open to question than is his physiology. He, however, is inconsistent even here. He permits children to be forcibly chloroformed by a plan which he condemns for adults. His words are (p. 52), "The way to make a young child breathe regularly is to make it cry, by holding the chloroform cap close down over its mouth and nose until it becomes unconscious and quiet, when the administration can be proceeded with in the ordinary way." He further does not throw light on the very thorny difficulty which young chloroformists experience under the following circumstances. A patient, as soon as the chloroform mask is placed near the mouth and nose, holds his breath. The mask is, according to our author's system, removed. On its reposition the same holding of the breath with struggling occurs, and so on. Even with the most long-suffering of surgeons the time must come when the question will be blandly asked, "Is the patient ready?" It is always easier to make rules than to meet exceptional cases. The author takes the unusual view, certainly unsupported by experience outside of Hyderabad, that "in dentistry the anæsthesia of chloroform, *whether partial or complete* (the italics are ours), is infinitely superior to that of gas." We can only suppose our author has failed to study nitrous oxide methods as thoroughly as he has those in vogue in the case of chloroform. The bulk of this book is concerned with the physiology of chloroform anæsthesia, but as all the recent work done on the subject, and, indeed, most of that done which has not received the imprimatur of H.H. the Nizam has been omitted, it is useless to enter upon the question, or re-slay the corpses of past physiological frays. It is worthy of note that the author warns against any one taking the pulse as a guide to anæsthesia under chloroform. Does anyone ever do so? If the author had confined his attention to what is really his main contention that deaths under chloroform due to over-dosage of the nerve-centres presiding over respiration can be prevented by watchfulness as regards respiration, his work would be all-valuable, and the meed of merit, which he appears to think has been unjustly withheld from him, would be universally accorded. His teaching in this direction is beyond praise; but we think he is quite wrong in his practice with regard to children, to incomplete anæsthesia, and the use of chloroform in dentistry.

Unpalatable Drugs made Palatable.—Dr. L. Freyburger, in his 'Pocket Formulary of Diseases of Children,' offers the following suggestions:

Aloin, one quarter grain, is disguised by ten minims of fluid extract glycyrrhizæ comp.

Ammonii bromidum, ammonii carbonas, and chloral hydras, one grain, are disguised by five minims of syr. aurantii.

Potassii bromidum, three grains, is disguised by fifteen minims of syr. aurantii.

Potassium iodidum, one grain, is disguised by one half drachm of aqua menthæ piperitæ.

Quininæ hydrochloras, one half grain, is disguised by twenty minims of syr. aurantii.

Sodii salicylas, three grains, is disguised by five minims of syr. simplex and one drachm of syr. cinnamomi.

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* *Specially reported for The Clinical Journal. Revised by the Author.*

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WITH DR. AMAND ROUTH IN THE OBSTETRICAL WARDS OF CHARING CROSS HOSPITAL,

FEBRUARY 21st, 1901.

Missed Abortion.

THIS patient came into the hospital a few days ago. She has been married only four months, and her history is that since her marriage she has had amenorrhœa. That persisted, and she was supposed to be pregnant. Her amenorrhœa continued until about a month ago, and then she began to lose blood. The doctor tried to save the abortion which seemed to threaten, but he soon found that the cervix was dilating, and the hæmorrhage was getting more marked, and there were intermittent pains, and therefore he concluded that abortion was inevitable. Accordingly he tried to encourage it by ergot and similar means. That failed, and in consequence he asked me to take the patient into the Hospital. When she came we found the uterus was almost in a state of tonic contraction, probably from the ergot. Intermittent labour pains could, however, be also faintly detected. The cervix was well dilated, sufficiently to admit two fingers; the head was presenting, and the membranes were intact. Nothing was done except to use vaginal douches, and to-day, after twenty-four hours, everything has come away without any trouble. It is evident from the specimen that the fœtus has been dead some time; in fact, it is a case of so-called missed abortion, the ovum having become partly detached, and the fœtus having died some week or two before it was actually expelled. The placenta is in rather a ragged state, and degenerate. If hæmorrhage had been profuse we should either have ruptured the membranes and plugged the vagina, or, as we have here every convenience, we should have anæsthetised her, and emptied the uterus by expression and digital extraction.

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Recurring Endometritis (? Gonorrhœal).

This girl in the next bed presents one of the cases where curetting has had to be done twice. It is rare that one finds two operations of that kind necessary. The history is briefly this: whilst pregnant she had a profuse leucorrhœa. A year ago her last child was born. The placenta was adherent. The probability is that that placenta was adherent by some pre-existing endometritis, an endometritis which does not lead to abortion, but often leads to adherent placenta by inflammatory trouble at the placental site, over the area of the decidua scrotina. It was followed by weeks of pelvic pain, with a constant yellow discharge. These symptoms were clearly inflammatory, not, I think, of "septic" origin, but due to some catarrh which had pre-existed, and was now restarted by extension of the endocervicitis which she has had during pregnancy. She was treated in the out-patient department, and for a time she got better, but eventually she had to come into the hospital. We then found that the uterus was very much enlarged (three and a half inches), and that it was in a condition of subinvolution, and that the sound caused bleeding. There was endometritis present. She was curetted, and did well whilst in the hospital. But within two weeks of going home she got more discharge, which went on for some time, and she has just been again admitted with a severe endometritis. In such cases I always use a sharp flushing curette, which I will show you, and I always endeavour to scrape everywhere all over the mucous membrane until I hear a grating sound, which generally means that one is down on the muscle-tissue. Of course one does not remove the terminations of all the glands; that is an impossibility, and therefore there is always a chance that in the remoter ends of the glands, which may run down into the muscle, there are septic or specific organisms, such as gonococci. I think that is usually the cause of the recurrence of the mischief. Sometimes it may be due to a reinfection, to a gleety urethritis in the husband, or it may restart from a chronic gleety endocervicitis. I hope after this curetting we shall find that the condition is cured, as we did it extra thoroughly. We found a good deal of fungous material present in the left cornu of the uterus in a little pouch, and that was possibly missed at the previous curetting, though I do not think so, because I always make a special point of searching the cornua.

Puerperal Muscular Swellings.

The next case is one to which we cannot a present give a name. She was confined on the 14th of January without difficulty. She was attended by a student, and by Mr. Dowse. the resident obstetric house physician. On the day following her confinement her temperature was found to be 102°, and was supposed to be due to the reaction from a rather prolonged labour. In a couple of days the temperature had dropped to normal, and there was no further trouble until the sixth day, namely, the 20th January. On that day she had a very smart rise of temperature from normal to 105°, but no rigor, and a swelling developed in the right leg, over the tibialis anticus muscle, a swelling precisely similar in character to those which you see she has now on the right arm. Within a few hours the temperature came down, and remained normal till the 28th January. During that week or eight days of normal temperature two other swellings came, one in the left arm, and the other in the left leg. The one in the arm was over the supinator longus, in the leg over the tibialis anticus, the swellings being symmetrical in position. The swelling in the right leg soon disappeared. After these had formed her temperature began to be a little septic in type, ranging from 99° to 102°, and this was found to be due to pus forming in the swelling in the left leg. The swelling was incised and the pus let out, and her temperature came down to normal again. This week, after several days of normal temperature, another swelling formed on the right arm, which is very hard and very tender, fixing all the muscles in the neighbourhood, but not involving the skin. The obstetric house physician on one occasion, believing that pus was present, as there had been in the left leg, made an incision with the object of letting it out, but failed to find anything like pus, or any evidence of dead bone, or, indeed, anything beyond mere (inflammatory?) exudation into the muscles. In the pelvis all this time there has been very little mischief, though there is evidence that there has been some exudation into the left broad ligament. It is quite clear that these swellings are not emboli from anything pelvic: otherwise the veins would have been involved.

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some vein in the leg or some vein in the arm, either as thrombosis of a septic character, as in phlegmasia, or as definite emboli, in which case if it had been embolic it would have caused a clot in the right side of the heart, or in the lungs. Indeed, I think we can absolutely exclude either septic thrombosis or embolism of pelvic origin, first of all because the veins are not involved at all, as far as we can see; and secondly, because the pyrexia has followed formation of the swellings instead of preceding, and was due then solely to the formation of pus in the left leg. As we have seen, the swellings came generally without any rise of temperature at all. Therefore one has to look about for some other cause. Such as these may have been systemic emboli, that is to say, emboli conveyed down arteries from vegetations on the valves of the heart (infective endocarditis.) Dr. Green and Dr. Abercrombie have both seen the case, and have failed to find anything except hæmic murmurs. I do not think, therefore, that the trouble is of cardiac origin. We have had the blood examined for streptococci, but none have been found. A few *Staphylococci albi* were seen, but these were probably an accidental contamination; therefore we are in the dark as to the cause of these swellings. In some obscure cases of blood-poisoning after lying in we may get swellings, not of an embolic character at all. I think we may be certain that this is not embolic; there has been no suppuration, except in one instance, as there would have been if it had been septic, or due to infective endocarditis; secondly, because the organs usually affected, the kidneys and spleen, are not affected in this case, there is no albuminuria, and the spleen is not enlarged; thirdly, because the heart is not showing any progressive evidence of disease. So at present we are waiting for a diagnosis. Meanwhile she is having perchloride of iron, in case there is anything of a septic character. The other symptoms have all cleared up, and she is getting better.

[NOTE.—A few days later the temperature rose and pus was found in the right arm. The temperature then resumed the normal, and the patient is apparently convalescent.—Feb. 28th.]

Hypertrophic Elongation of Supra-vaginal Cervix.

Here is a patient who at first sight seemed to be an ordinary case of procidentia uteri. You can see she has a very hypertrophic cervix protruding from the vulvar orifice with the inverted vagina all round.

The anterior wall of the vagina is ulcerated, due to irritation caused by the urine. Some years ago I saw this patient, and she had a catarrhal hypertrophic infra-vaginal cervix. The cervix was bilaterally fissured, and both lips were swollen and elongated. I thought it would be sufficient then to amputate both lips of the cervix level with the vagina by Schrœder's method, but soon after she left the hospital the cervix again appeared at the vulva. This time she comes with her cervix outside the body. The question is, is it a case of procidentia or one of elongation of the supra-vaginal cervix? On passing the finger posteriorly one finds one can feel an elongated, stretched, cord, about the size of one's finger, reaching up as far as one can reach. This is the elongated cervix. The posterior *cul de sac*, is also much shortened, the anterior completely obliterated; so that there is a complete anterior but very little posterior colpocele. If this were a case of ordinary procidentia uteri with retroversion one would be able to feel the fundus. Instead of that, in this case the fundus cannot be felt at all. She is so very stout that it is practically impossible to bimanually examine her. The cause of supra-vaginal elongations is that the patient has a cystocele, and that the cystocele is continually pulling on the supra-vaginal cervix and stretching it until the cervix appears at the vulva. If the retro-uterine and broad ligaments are doing their duty, their resistance retains the fundus uteri in position, and the result is elongation of the supra-vaginal cervix. If this were a case of procidentia with retroversion, the sound would go back two and a half or three inches. But in this case, knowing that the fundus is at its normal position, one expects the sound to go in at least five inches. You see the sound goes in six and a quarter inches, proving that it is a case of supra-vaginal elongation of the cervix. In addition to this elongation, she has lately had a good deal of amenorrhagia and metrorrhagia, as well as some dysmenorrhœa. Her age is forty-four, and the question is what should be done for her? It is difficult to curette a uterus of this length, and digital exploration is impossible. There is probably some fundus endometritis. When I first saw her the operation I thought of doing was the

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ordinary one for removing a supra-vaginal elongated cervix, that is to say making a circular incision round the cervix and stripping the bladder right off, as far as one can get, opening the pouch of Douglas if necessary, and after tying the broad ligaments on each side, amputating the cervix about three inches from the external os by Schroeder's method. But this patient has cardiac mischief; she also has advanced Bright's disease and general œdema which is everywhere present and has already involved the vulva and cervix. There is also some pyuria, with acidity, showing I think pretty clearly that the pelves of the kidneys are inflamed, in fact that she has a pyelitis. So she is not in a satisfactory state to do anything of an operative character. What I shall have to do, especially as she is averse to operation, is to be satisfied with trying to give her a support which she can wear from the outside, a sort of cup and stem pessary or something of that sort. As long as she is lying down it keeps pretty well up. There is nothing to be seen, now that I have reduced it. It is as far up as it ought to be, and the sound only enters four inches. When we have got that ulceration right the cup and stem pessary will keep the vagina and cervix up in position.

Posterior Colpocele.

Here is another patient who was admitted with a minor though very uncomfortable trouble—a prolapse of the posterior vaginal wall—a posterior colpocele. The main feature is a large pouch formed out of a lax posterior vaginal wall, into which the rectum does not come. If this condition of posterior colpocele were allowed to go on it would drag down the cervix; and if the whole uterus did not prolapse, we should get the same result as in the other case, elongation of the supra-vaginal cervix. I shall do a combined perineorrhaphy and posterior colporrhaphy, that is to say split this recto-vaginal septum and turn up a large vaginal flap, extending upwards one and a half to two inches. Sutures are then passed which penetrate the labia majora, and are embedded in the flap so as to make a pseudo-perineal body and form a resistant mass there. That is the best operation. The slight cystocele does not need operation, it is a very minor affair, and the cervix is now at a normal level.

Chronic Endometritis and Salpingitis.

The next patient is nearly well now. She has had some endometritis and salpingitis of a subacute character, which has led to the usual symptoms of menorrhagia and leucorrhœa. She had a large uterus with definite endometritis, and some swelling of the left tube. At the curetting, as one expected, I removed much fungous overgrowth, especially in the left cornu, where the affected Fallopian tube enters. One knows by experience that if one gets the endometrium and the pouch leading to the Fallopian tube into a healthy state, the Fallopian tube almost always recovers itself if merely in a state of chronic inflammation.

Abortion. Acute Perimetric Abscess.

In the next case we have one of the results which may follow abortion. There are many of the sequelæ of abortion which one has to treat. One of the commonest things which may be found after an abortion is something which has been left behind; it may be placenta, or even a bit of decidua. That is called an "incomplete abortion." Some of the cases which give rise to trouble are of the nature of the first case we saw to-day, that is to say, "missed abortion." In that case, as I mentioned, the doctor tried to save the "threatened abortion," but he soon came to the conclusion that it was "inevitable," and failure of the ordinary means to empty the uterus brought her here. Other sequelæ of abortions are inflammatory ones. As a result of a bit of placenta left behind, as in an incomplete abortion, a patient may get decomposition of the contents of the uterus, with some variety of sepsis as a result. That sepsis may be of two types: it may be sapræmic, where the chemical products of decomposition are absorbed into the blood; or it may be true septicæmia, where the patient becomes infected by the germs, usually streptococci, in the retained products, the germs multiplying in the blood itself. Much the commoner of these two after abortion is the sapræmic type. A woman may have rigors, a high temperature, and may apparently be very ill indeed, with a most offensive discharge. If you explore that uterus you will probably find that there has been something left behind, and within a few hours after removing the retained product the patient's temperature is normal. Or she may get rigors immediately after you have removed it, because

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you have made a raw surface, and there has been, in consequence, some fresh absorption of the chemical poison. After that, if all goes well, the temperature comes down to the normal. In true septicæmia, if there is anything retained, you find that the temperature does not fall. Sometimes there is local infection, that is to say a patient gets an abrasion of some sort, and the lymphatics carry the chemical products of decomposition, or, more likely, specific microbes, such as streptococci. The patient gets a local peri- or parametritis—parametritis by direct extension through the lymphatics into the broad ligament,—perimetritis if the placental site high up in the body is infected, or if infection is carried along the Fallopian tubes. This patient had missed two periods up to December, 1900. Not desiring any further pregnancies she tried to bring on abortion by douches, and sitzbaths, and drugs, but failed. She then passed a wooden knitting needle into the os uteri, using her finger as a guide. In so doing she injured the posterior wall of the supra-vaginal cervix, for, owing to the uterine body being sharply anteverted, she was unable to pass the probe into the uterus itself. This proceeding seems to have caused her a little pain, and drew a little blood; that occurred on January 15th. On the 18th she was seized with acute stabbing pain in the abdomen, and vomited three or four times. On the 20th there was a blood-stained discharge from the vagina, which lasted until her admission on the 22nd. One then found that the uterus was quite fixed in its lower part, whilst the fundus was movable. There was a hard exudation in Douglas's pouch, which was very tender, and the cervix was slightly painful, but one was unable, on the first occasion, to pass one's finger through the os. One knew the uterus was large, but one could not be sure that anything was still inside. On the following day the cervix was more dilatable, and allowed one's finger to pass in. One could then ascertain distinctly that there was something inside the uterus, which felt like a placenta, although she was only supposed to be two to two and a half months pregnant. The following day, as nothing had come away and the discharge was becoming offensive, I rapidly dilated up the uterus, and then found, on passing my finger, that there was a large mass inside. I got that away after separating it from its uterine attachment, and it turned out to be a degenerating apoplectic ovum or blood-mole, an ovum into the tissues of which hæmorrhage had taken place. The fœtus itself had disappeared, and had probably died as a result of this hæmorrhage, and the different measures which had been employed. Next day the temperature became normal, but then it began steadily rising, about a degree each day, until it was 103½°, and the exudation in Douglas's pouch became more marked. I was on the look-out for pus forming, and on the 31st I examined carefully *per rectum*, because there was some rectal tenesmus, and I found a softened spot very high up in the rectum, which looked very much as if it was going to open there. That was in the afternoon. I decided to operate on the following morning by opening the posterior vaginal *cul-de-sac* and letting out the pus. In the interval the pus opened its own way into the rectum, and there was an immediate drop of temperature. Very little pus was coming away, so, as is my rule in these cases, I made a counter-opening *per vaginam*, and got into Douglas's pouch. There I found a very large abscess cavity reaching in all directions behind the uterus, and a quantity of very fœtid pus came away. The temperature has been practically normal ever since. I stitched a drainage-tube in, and when that came out, as it generally does at the end of a week, I put in a Chambers's diverging stem pessary, which is convenient for keeping open a sinus of this sort. It may be left in until it is forced out, when it is evident there is no cavity left. It cannot slip up into the cavity because of the button on the end.

Ruptured Ovarian Cyst with Papillomatous Outgrowths.

In the next case one cannot be quite certain of the diagnosis. Her age is thirty-six and she has never had children, though she has been married twelve years. She was a patient of a doctor in the neighbourhood, and the first I heard of her was in 1898, when, whilst walking, apparently in good health, she slipped off the curb-stone, and experienced a sharp pain. She went to bed for some time, with severe pain and pyrexia, and eventually became an in-patient. At that time the abdomen was occupied by a hard mass, which was resonant in parts, reaching nearly to the umbilicus, and the whole pelvis was full of a perfectly fixed hard mass, in the middle of which the cervix was placed.

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One could not move it in any direction. It appeared to me that the most likely diagnosis was that she had had a fibroid, which had suddenly got impacted in the sacral hollow by the patient slipping off the curb-stone, and that this had led to some amount of perimetritis and possibly to some pelvic hæmatocele. She rapidly improved, and the swelling in the abdomen almost completely disappeared, leaving it supple and soft, but still a little full. The pelvis itself got almost completely free, except that the uterus remained rather large, and retroverted. Behind the uterus, apparently either growing from it or adherent very closely to it, was a round body about the size of a hen's egg. When she left the hospital that was her condition. I thought at the time that it was probably a retro-uterine fibroid growing from a retroverted fundus, but still it was a little elastic for that, and my notes say that it was possibly some variety of ovarian cyst. It was clear it had not been an impacted fibroid, as I had thought. The following year, about the same time, whilst mangling, she had a sudden sharp pain, as if something had given way or got twisted in the abdomen. She was seized with rigors, high temperature, and abdominal swelling, and vomiting, just the symptoms one would find with a twisted pedicle of an ovarian cyst. That was in November, 1899. She was under the care of another doctor then, and I did not see her. Apparently she lingered on at home until April, and then she came in under Dr. Green, having then well-marked ascites. I saw the patient with Dr. Green, but we could make out nothing further, except that the swelling behind the uterus was rather larger. She was tapped, and twenty and a half pints of blood-stained fluid were drawn off. She went out with a much smaller abdomen, but with some free fluid still in it. It was supposed at the time that it was of hepatic origin, for there did not seem to be enough in the pelvis to explain it. I heard nothing more about her until this month, when she was sent in to the hospital by another doctor. We then found that she had a very large distension of the abdomen from free fluid, but the bowels were not floating on the top as they ought to have been; they were at a deeper level. She had not the ordinary signs of ascites. That is to say, the abdomen was not resonant on both sides, but only on the right. *Per vaginam* one found the uterus fixed, and the mass behind on the right side was fixed and very elastic. The only other condition which was to be felt was a swelling in this position, a sort of tongue of tense induration coming down from under the ribs, somewhat in the position of an enlarged spleen, but more superficial than a spleen, resonant on percussion, and there was almost certainly some inflammatory exudation connected with it. This swelling seems adherent to the parietes, I think it must be some sort of local peritonitis. Yesterday we had the abdomen tapped, and twenty-three pints of fluid were drawn off. Here is a sample of it, by which you see it is a smoky-looking fluid. It becomes solid on boiling, owing to the albumin which is in it. The specific gravity is 1025. Under the microscope the deposit is seen to contain numerous cholesterin crystals with blood-discs and white corpuscles. There are also a considerable number of granular cells, such as those described by Gluge, more granular than the ordinary Drysdale ovarian large cells, but still of the same type. In addition to that there are a great many fat globules. The question is what is this ascites due to? When one can exclude causes connected with the heart and kidney and liver, free fluid in the peritoneum is generally called hydroperitoneum, and may be due to any one of half a dozen things. It may be due to a solid ovarian tumour, such as a sarcoma; it may be due to malignant disease; or more rarely to chronic salpingitis, or at all events adenoma of the salpinx, and sometimes one sees it in cases following rupture of an ovarian cyst. Sometimes, but rarely, it is associated with fibroids.

In this case all that one has to go upon is the fact that she has a fixed uterus with something behind, which is no doubt the cause of the fixation. There has been some inflammatory exudation on at least two occasions, as a result of something in the pelvis. My impression is that we shall find, when we come to make an exploratory operation, that she has a small ovarian cyst behind the uterus, which on one or two occasions has undergone twisting of its pedicle, and as a result of that there has been hæmorrhage into the cyst and subsequently a rupture of that cyst. I think it is likely that in the first instance it was not a twisted pedicle, but a rupture of a loculus, and very likely of a dermoid. Or it may be a cyst of the ovarian hilum containing papillomata, which have invaded the peritoneum. This would explain, not only the

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free fluid and the cholesterin and the granular large Drysdale cells, but also the fat globules. If this is so the cyst is still open, and is not only pouring out this blood-stained serum, but is setting up some mischief here and there, and the nodules one can feel studded over the peritoneum may prove to be due to spread of papillomata. The correct treatment is to make a small incision to find out what it is, and, if our diagnosis of an ovarian cyst be verified, to remove it. She is now comfortable because we have drawn off a lot of fluid, but we know that in her case it fills up again very rapidly.

[NOTE.—At a laparotomy by Mr. Stanley Boyd on February 27th, the mischief was found to be due to a fixed paroöphoric cyst the size of a billiard ball, surrounded by papillomatous growths which had spread from the inside of the cyst, and had led to oases of inflammation and growth at different places. The left ovary was also undergoing the same changes. Her chances of permanent benefit are excellent.]

Heredity in Diabetes Mellitus.—J. H. Pleasants, in the 'Johns Hopkins Hospital Bulletin' for December, 1900, reports six cases of diabetes mellitus in a single family, occurring in three generations. That heredity has long been recognised as a factor in this disease is shown by the fact that the first references to it in the literature were in 1696. In 1798 Storer called attention to what he termed "mild habitual or family diabetes." Modern writers place hereditary incidence at from 27 to 5 per cent., the variation probably being due to the different character of the patients who furnish statistics. He is of opinion that the importance of heredity in this disease has been under-estimated. The disease often occurs in an uncle, aunt, or cousin, while the parents escape. In the same way a grandparent may be diabetic while the parent escapes. When successive generations are affected, there is a tendency for the disease to develop at a progressively earlier age. When more than two members in the same generation are diabetic there is a tendency for the disease to appear at approximately the same period of life. Hereditary diabetes developing in the first two decades of life is often of a severe character, while the cases developing later in life are generally of a mild type. In a certain number of cases the disease has appeared in the children prior to its appearance in the parents.—*Medicine*, March, 1901.

ON THE FORM OF THE ALVEOLAR ARCH.

By W. ARBUTHNOT LANE, M.S.,
Surgeon to Guy's Hospital and to the Hospital for Sick Children.

THERE has been much discussion of late amongst dental surgeons as to the causation of the forward protrusion of the incisors of the upper jaw, which is seen so frequently in our present state of civilisation, and many and various reasons have been put forward as to its causation.

I propose to consider the subject from the point of view of the anatomist and general surgeon, and to endeavour to throw some light upon it.

We must remember that the functions of the bones of the face are three in number:

1. To surround the passage by which air alone is transmitted to the lungs.

2. To sustain the strain exerted by the muscles of mastication, and to transmit and diffuse the resistance offered by the crushed food in the forcible approximation of the teeth during its attrition.

3. To surround and protect the eyes.

Experiments are made by nature on all sides showing the influence which the exercise of these several functions exerts upon the skeleton, all capable of accurate measurement and definition. If an eye be removed early in life the degree of development of the orbital space which contained it, and of the soft parts which surrounded it, is less than that which exists on the opposite side. Such imperfect development of the skeleton as arises in consequence of the absence of the pressure exerted by the globe of the eye is very limited.

If the permanent teeth are removed early in life the alveoli waste, and the bones along which force is distributed, either as pressure or strain, become thinner and thinner. If in the growing child, however, the teeth are prevented from performing their normal functions, as, for instance, by ankylosis of one or both temporo-maxillary articulations, we find that the lower jaw develops much less rapidly than does the upper, showing two things:

1. That besides the presence of the teeth there is an additional factor controlling the development

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of the upper jaw that does not influence the lower to anything like the same extent when movement of these bones upon one another does not exist.

2. That in a normal skeleton the lower jaw is dependent for its perfect development upon that of the upper.

Fig. 1 illustrates the condition of a girl aged

Fig. 1.

twelve, operated on for bony ankylosis of the temporo-maxillary articulation in 1893. The joint was destroyed when she was eighteen months old.

This shows exceedingly well the difference in the development of the two jaws under these circumstances, the upper being much larger than the lower.

Figs. 2, 3, 4, and 5 represent the same condition in a less marked degree in cases of bony ankylosis of the temporo-maxillary articulation which have been successfully operated on.

The removal of the function of the nasal cavities in the growing child produces an influence on the development of the bones of the face which is most marked, and varies directly with the completeness of the loss of function, and inversely with the age of the child. The factor upon which the bones which surround the nasal cavities depend for their development is the pressure exerted upon the interior of the spaces by the air as it passes through them.

It is this pressure that increases the breadth of the nasal space, and determines the degree of development of the cavities in the superior maxilla and elsewhere which communicate directly with it.

In consequence of this lateral development of the nasal spaces the anterior surface of the upper

Fig. 2.

jaw is rendered prominent anteriorly, and the malar bone antero-laterally. For the same reason the alveolar arch is widened.

Pressure is exerted in a downward direction,

Fig. 3.

depressing the arch of bone which separates the mouth and nasal cavities, and tending also to increase the breadth of the alveolar arch of the upper jaw.

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Fig. 6, representing a vertical transverse section through a normal upper jaw shows at a glance the directions in which force exerted at right angles to the surfaces of the nasal space tends to produce

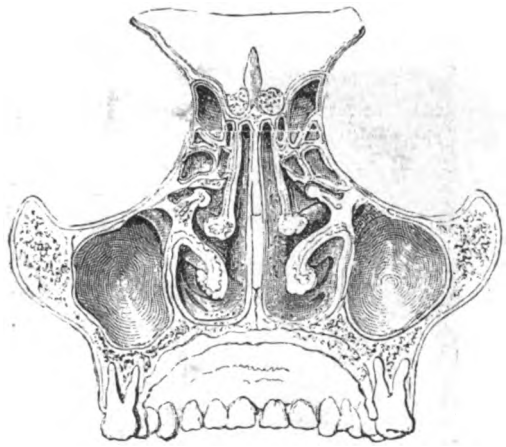
Fig. 4.

change in surrounding structures. Again, this force exerts a pressure also in a forward direction, tending to project the nasal bones and septum anteriorly.

Fig. 5.

The atmospheric pressure upon the interior of the nasal cavities tends to increase the length of the alveolar arch of the upper jaw, providing ample room for the teeth, to enlarge the interval between the alveolar margins laterally, to make the anterior portion of the arch more rounded and convex forwards, and to diminish the height of the palate. If the lower jaw is capable of moving

Fig. 6.



normally upon the upper this atmospheric pressure exerts an indirect influence on its development, which, as I have shown, can be readily measured in cases in which such movement is in abeyance.

Now let us consider in detail the several conditions which result from the more or less complete loss of this developmental factor; but before doing so I will call your attention to the general condition of the subjects in which such loss of function is found.

Owing to our present state of civilisation there exists a considerable proportion of children whose mechanical relationship to their surroundings differs largely from that of the vigorous and robust. The most marked feature in their condition consists in a deficient performance of the respiratory function, and the degree of diminution in their vitality below the normal standard can be readily determined by the amount of such deficiency.

These children possess an amount of energy and vitality commensurate with their respiratory capacity. They obtain their scanty supply of oxygen by the rapid and imperfect contraction of the diaphragm, their chests being retained habitually in a position of complete expiration.

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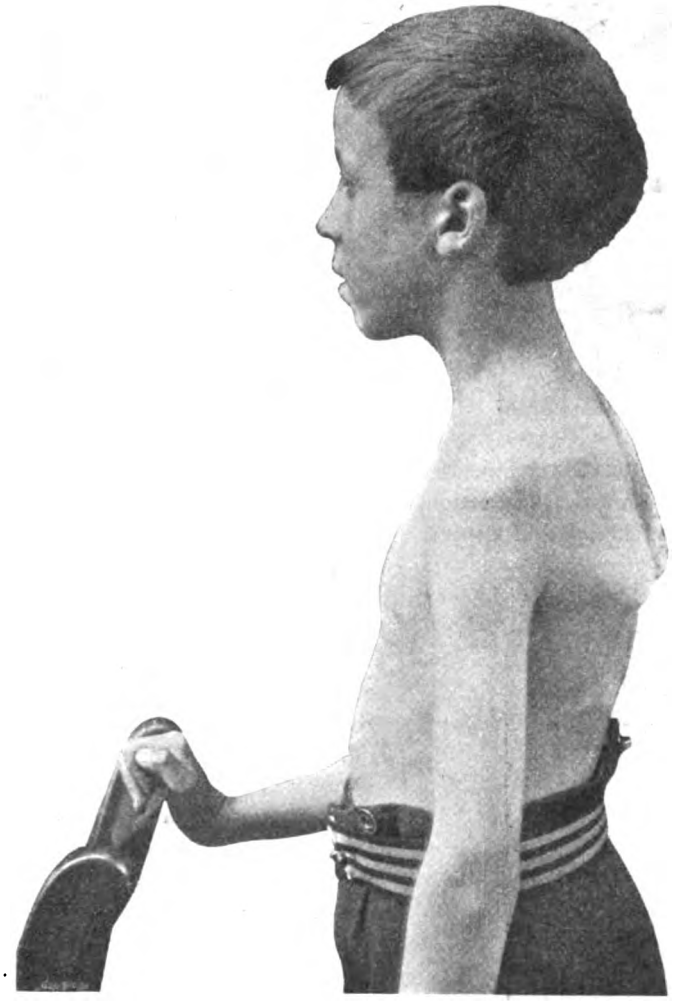
Figs. 7 and 8 represent the attitude assumed by such a child. It is what I have called the symmetrical attitude of rest of the trunk, popularly described as round shoulders. Observe the prominence of the abdomen, the flattening of the front of the chest, and the projection of the lower angles of the scapulæ. This represents only the very ordinary type, the more marked features being shown in Fig. 9, a photograph of a girl of fifteen years of age. In this case the bones have altered materially in form, in obedience to the law that the rate of bone formation in the several parts of a growing line varies inversely as the pressure is transmitted. Such children, because of the habitual assumption of attitudes of rest, develop a fixation of the asymmetrical resting position of the trunk (the so-called lateral curvature or scoliosis), knock-knee, and flat foot.

By their deficient oxygenation the resisting capacity of the tissues to the entry of organisms is correspondingly diminished, and in the young subject the naso-pharynx is the area of the body in which organisms most readily secure a foothold. In consequence the child is affected with a sequence of colds, the organisms frequently extending their area of infection to the larynx, trachea, and even to the smaller bronchial tubes, producing laryngitis, bronchitis, and broncho-pneumonia.

Fig. 7.



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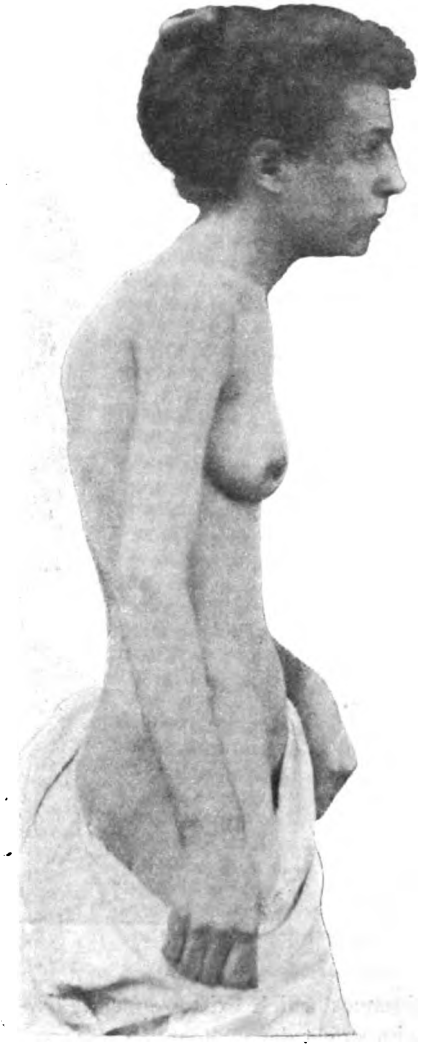
The infection of the mucous membrane of the naso-pharynx produces an enlargement of the glandular tissue in the naso-pharynx (called the pharyngeal tonsils), of the faucial lymphatic tissue, and of the lymphatic glands in the neck.

The result of all this is that the nasal cavities no longer transmit air, or only a small proportion of the normal amount, and the bones of the face are for the time being deprived, more or less completely, of the mechanical factor on the presence of which they are dependent for their complete development.

In consequence the nasal cavities are narrow, and the spaces that communicate with them laterally are small, and the bones surrounding them have not their normal prominence.

FIG. 8.

FIG. 9.



The septum not uncommonly deviates from the vertical, or presents lateral excrescences called "spurs," because of the interference with its development.

Again the length of the alveolar arch is dimi-

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nished, so that the teeth are crowded, the sides of the arch are abnormally close, and the palate is high; the front of the arch is displaced forwards so that the upper incisors project much beyond the lower.

Fig. 10 represents a vertical transverse section through such a palate and alveolus, and in contrasting it with Fig. 6 it is seen at once that the instead of projecting below the free margin of the incisors leaves them uncovered to a varying extent.

Many of these features are shown more clearly in Fig. 11. One point of great interest about this condition of imperfect development of the nasal cavities is the manner in which it is transmitted to the offspring. I know no other acquired de-

Fig. 11.

differences which exist are clearly consequent on the imperfect development of the nasal cavities.

Again, as you see in Figs. 7 and 8, the bridge of the nose is dwarfed, being less prominent than it should be; the nasal bones and the nasal processes of the upper jaw are concave antero-laterally, instead of convex, giving a "pinched" appearance to the nose; the anterior nasal apertures are mere slits, not moving in inspiration; and the upper lip formity which is handed down so rapidly or so markedly. On this account we find a high palate and all the other indications of imperfect development present in the young child, giving many the opportunity of regarding it as frequently "congenital," or in other words as consequent on factors which acted on the antecedents and not on the individual itself.

That the development of the bones of the face

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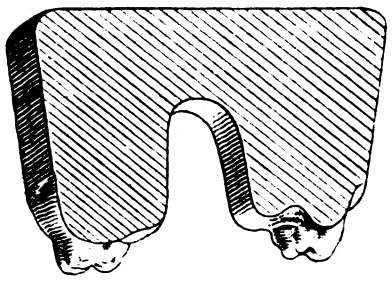
can be materially influenced by the restoration of the influence of the mechanical factor I have proved without question to my complete satis-

FIG. 10.



action, and the amount of alteration obtainable varies with the thoroughness of the restoration, with the age of the individual and, with the amount of imperfection, whether acquired or hereditary.

On this account the return to the normal type is rarely complete, and in the case of the alveolar arches, and the arrangement of the teeth, the removal of some, and pressure exerted by mechanical arrangements upon others, are very important additional aids.

Modern Treatment of Diphtheria.—In a review of what has been accomplished by anti-diphtheria serum, Escherich shows that while 54·8 per cent. of his patients with diphtheria—115 in all—between 1890 and 1894 were cured, since then 86·92 per cent. of 1147 patients have recovered. This includes 80·42 per cent. of recoveries in 378 cases of progressive croup, and 57·38 per cent. in 176 cases of septic-toxic variety. None of the latter were cured before 1894 in his experience. He gives 1000 to 1500 units in localised diphtheria, double this amount in progressive croup, and three or more times this amount in the septic-toxic form, but as much as 20,000 units have been given by some physicians. The serum exanthemata have been reduced from 11 to 3 per cent. of the cases. He has had one fatality similar to the sudden death of Langerhans' child, that attracted so much attention a few years ago. A boy of eleven months was given a prophylactic injection on account of sudden laryngitis with symptoms of stenosis requiring intubation. He died in a few hours, with symptoms of heart failure. The heart was found very much dilated and the thymus soft and juicy, weighing 15 grms.—*Journ. A. M. A.*, February 23rd.

CHRONIC SUPPURATION IN THE NASAL SINUSES; ITS DIAGNOSIS AND TREATMENT.

By A. S. COBBLEDICK, M.B., B.S.Lond.,
Late Senior R.M.O., Golden Square Throat, Nose, and Ear Hospital.

IT is only during recent years that nasal diseases have received the amount of attention they deserve, and it is surprising, when one considers to what troublesome subjective symptoms they give rise, to say nothing of the dangerous complications that may ensue if they are left untreated, that rhinology has taken so long to become a recognised special branch of surgery.

The rise of rhinology has certainly proved that chronic suppurative disease of the accessory sinuses is much more common than was generally supposed, but it has also led some rhinologists to assert that these diseases have increased and are increasing in frequency. It cannot, I think, be justifiably argued that because nasal suppurations were not diagnosed or treated in the past that such diseases have become more common of recent years, since attention has been specially drawn to them.

Whereas acute cases of any disease force themselves on our notice, chronic processes, such as we are now dealing with, are very insidious in their onset, and the severity of the symptoms which they produce is so largely dependent on the patient's temperament that it is most difficult to obtain any reliable statistics as to their frequency in the past.

There is also no doubt that when the surgeon or specialist draws special attention to any branch of surgery or medicine improved means of diagnosis and treatment are the result; in short, progress is made, and with it many old fallacies disappear, and diseases at one time unrecognised, or regarded as rare, *apparently* increase in number. Take the case of post-nasal adenoids as an example; since their discovery in 1868 there has been a great *apparent* increase of this condition, but it is doubtful if any one made the statement that they were more common to-day than they were previous to their discovery, whether he would be believed.

The same remarks are applicable to such diseases as myxœdema, actinomycosis, etc. It is quite common in any throat hospital clinic to

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meet with cases of nasal suppuration which have been running a chronic course for twenty, and even thirty years without any attempt having been made to form a diagnosis, much less to perform a radical operation, and it is interesting to speculate on how these untreated cases terminated. In the case of chronic suppuration in the maxillary antrum, extensive necrosis of its walls, no doubt, in time produced such a condition of things that the general surgeon had finally to deal with the trouble. Chronic frontal sinus trouble, on the other hand, is so difficult to diagnose with any degree of certainty, and often causes so little subjective trouble, that severe cranial symptoms—necrosis of the frontal bone, septic meningitis, or cerebral abscess—may set in without the primary cause of the disease being suspected; and it is not unlikely that some such obscure cerebral conditions, where no primary focus was discovered, were due to frontal sinus or ethmoidal-cell mischief of a chronic suppurative nature.

A few anatomical facts having an important bearing on the diagnosis and treatment of diseases of the accessory sinuses will add to the interest, and serve to elucidate some important points in the treatment.

A wet specimen of the nasal fossa shows the relative position of the turbinated bones, and the fact that the frontal sinus, most of the ethmoidal cells, and the maxillary antrum, all open into the middle fossa of the nose in the above order, from before backwards.

Examination of the superior maxillary bone in the dry condition shows:

(*a*) The very large size of the opening of the antrum into the nose, caused by the absence of the maxillary portions of the inferior turbinate, lachrymal and ethmoidal bones.

It is well to articulate the inferior turbinate with its superior maxillary bone, and note the position of the suture so formed, for it is in this region that exploratory puncture of the antrum is made.

(*b*) Another important point to note is the way in which the inner wall of the antrum increases in thickness from the line of attachment of the inferior turbinate downwards to the floor of the nose, so that for nearly a third of an inch above the floor of the nose the antral wall is extremely dense and thick, and above that the bone becomes very much thinner. This should never be forgotten in making an exploratory puncture of the antrum from the nose.

(*c*) The inner and anterior walls of the antrum meet at a point opposite the socket for the first bicuspid tooth, or at a point between it and the canine socket. This point is some distance outside the margin of the bony anterior nares. The importance of this will be seen when considering the radical cure of antral suppuration.

(*d*) The sockets in the alveolus for the first and second molar teeth are only separated from the antral cavity by a thin partition of bone. The second bicuspid socket is generally so situated in relation to the floor of the antrum that it is not easy to force a passage into the antrum, although the proceeding is frequently possible.

(*e*) In rare cases the antrum may have extremely thick walls, and be altogether or in part obliterated; unless this possibility is recognised the diagnosis of antral disease may be rendered difficult, and treatment at first ineffectual. A loculated antrum, due to bony septa between the anterior and posterior walls, is also a rare condition, which, however, should not be forgotten.

With regard to the ethmoidal cells, the main point is to fully realise their size and extent, which is considerable, and the very thin partition intervening between them and the orbit externally, and the cranial cavity above.

The anterior cells may almost surround the infundibulum leading from the frontal sinus, a point which it is well to remember in washing out a frontal sinus, as the cannula is not infrequently in one of these cells when it is supposed to be in the sinus.

The roof of the nasal cavity should be carefully examined, both in a dry and recent specimen; it should be noted that the portion of the roof corresponding to the cribriform plate is situated some distance from the anterior nares, and also that its transverse diameter is quite small, so that the width of each nasal cavity below the cribriform plate is less than two millimetres.

From this it is clear that but little damage can be done to the cribriform plate during operative measures, excepting by the use of a comparatively sharp-pointed instrument, a fact which is amply borne out by clinical experience.

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The frontal sinus is remarkable for its variation in size, and for its unsymmetrical arrangement. It is quite rare to find the two sinuses equal in size, nor is there any means of diagnosing a large from a small one with any degree of certainty. The frontal sinus may extend laterally to the extreme limit of the frontal bone, and in an upward direction for as much as two or three inches.

As a rule the sinuses are separated by a median bony partition, varying in thickness; in a small number of cases the septum is perforated, so that there is a free communication between the sinuses. Unlike the antrum, it is quite common to meet with bony septa passing from the anterior to the posterior wall, especially at the periphery, upwards and outwards.

The sphenoidal cells, situated posteriorly, are also usually unsymmetrical, and cannot be seen from the anterior nares before complete removal of the middle turbinate bones; even then unless the anterior wall has been destroyed by disease, or during the removal of polypi, the openings into the nose are not at all easily seen or demonstrated.

Diagnosis.—The common causes of a chronic suppurative discharge from the nose are:

1. Suppuration in one or more of the accessory sinuses.

2. Bony necrosis, usually syphilitic in origin.

3. Foreign bodies and adenoids. These are usually found in children, but it should be remembered that the accessory sinuses are liable to disease in children as well as in adults. A purulent discharge in children may be due, during the first few years of life, to an unknown cause, the naso-pharynx being quite clear, and the accessory sinuses undeveloped.

There is not very much difficulty in diagnosing accessory sinus suppuration from the other conditions enumerated above.

Bony necrosis of syphilitic origin is usually associated with other signs of syphilis, more or less destruction of the septum nasi and soft palate; the ozœnatous odour, in the absence of atrophic rhinitis, is sufficient to raise suspicion of necrosis.

If any trouble arises in diagnosis it is more likely to be in children than in adults; if the following points are remembered they will assist in arriving at a correct diagnosis:

1. By far the most common cause of a nasal discharge in children is the presence of post-nasal adenoids, and the discharge is bilateral, therefore the post-nasal space should always be examined.

2. If the discharge is unilateral, a foreign body should be strongly suspected and sought for.

3. Do not diagnose accessory sinus trouble before the sinuses are developed; remember that the frontal sinus is not developed until the seventh year; that the antrum, although developed early, is quite small until after the second dentition, and that the ethmoidal cells have not bony walls until the fourth year, and at that age they are quite small.

When the suppurative process has been diagnosed as involving one or more of the accessory sinuses, the chief difficulty consists in accurately localising the disease. The history of these cases does not give much assistance; the onset is usually indefinite, patients complain that they have a chronic cold in the head, with nasal obstruction, and more or less discharge. Symptoms such as pain, amount and nature of the discharge, do not render much assistance, for both maxillary antrum and frontal sinus suppuration may be accompanied by severe pain, not unfrequently of a neuralgic character, and in both cases it is referred to the same part, viz. the supra-orbital region; the disease may, however, run a prolonged course with nothing worse than the discomfort of a more or less continuous discharge.

I have known suppuration in quite a small frontal sinus cause such intense pain that morphia was indispensable, and the patient eventually became a victim of the morphia habit. Some few cases of frontal sinus suppuration complain of a bursting frontal headache lasting for some days, and only relieved by a free flow of pus; this condition of affairs is evidently due to the discharge becoming pent up in the sinus, and is rather suggestive of frontal sinus trouble; as will be seen later, too much reliance must not be placed on such a history, for this paroxysmal discharge may occur in chronic antral, and even in ethmoidal suppuration. I have also found tenderness on pressure a very unreliable symptom in a chronic frontal or antral suppuration. Patients suffering from nasal suppuration seem very prone to attacks of extreme depression, sometimes verging on melancholia.

A careful examination of the nasal fossæ is of more value in diagnosis than the history or a consideration of the patient's symptoms.

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Various abnormal conditions are found in the nose, the most common of which are:—Nasal polypi, bathed in pus, either arising from the mucous membrane of the middle turbinate bone, or from the ethmoidal cells; sometimes they are so far forward as to appear to be coming down the infundibulum; they never, however, arise from the frontal sinus, but from the extreme anterior end of the middle turbinate, or the anterior ethmoidal cells which open into the upper part of the infundibulum.

Not unfrequently polypi are so abundant, that the condition of the fossæ and ethmoidal bones is completely obscured, and both the anterior and posterior nares are filled with large polypoid masses; they must be freely removed before their origin can be definitely discovered.

Where polypi are not so numerous, the point from which they arise may be made out at a first examination, and undoubtedly the most common site for them is the mucous membrane of the middle turbinate bone; this bone and its mucous membrane may be very much hypertrophied, so that the middle fossa cannot be examined until the anterior portion has been removed; this condition of affairs frequently accompanies antral suppuration.

Other conditions frequently met with are small raspberry-like protrusions in the middle fossa; these are granulations or small polypi, and they may have their origin in the middle ethmoidal cells.

Pus is usually associated with all the foregoing abnormal appearances, and in most cases its origin can be traced to the middle fossa; it is the fact that the antrum, ethmoidal cells, and frontal sinus all open into the middle fossa that makes an exact and speedy diagnosis so difficult.

In a certain number of cases nothing abnormal is seen, excepting, perhaps, a small point of pus in the middle fossa. These cases are especially apt to be overlooked, and for the reason that these patients, unless instructed to the contrary, blow their noses very freely and violently before entering the consulting room; the result is that no trace of pus is found, and from the patient's history the trouble may be ascribed to post-nasal catarrh or hypertrophic rhinitis; it is, therefore, always well to instruct the patient to leave the nose uncleansed for an hour or so before examination if there is a *suspicion* of chronic suppuration.

It must be remembered that in nearly 50 per cent. of cases of nasal suppuration the antrum and frontal sinus are both diseased; if this possibility is not borne in mind, and treatment is only directed to the antrum, a cure is impossible on account of the frontal sinus discharge passing into the antrum, and so keeping up the suppurative process. As a rule, an exact diagnosis can only be arrived at by a process of exclusion in the treatment.

In like manner mistakes have been made by hastily diagnosing a suppuration as of frontal sinus origin without first excluding the possibility of its being antral in origin, *e. g.* on the recommendation of a well-known rhinologist both frontal sinuses were opened from without after unsuccessful intra-nasal treatment—irrigation, etc.,—extending over a period of eighteen months; both sinuses were found to be quite healthy, but on opening the maxillary antra both were found to be full of fœtid pus. Cases of this nature must occur unless a routine method of diagnosis by exclusion is made. The following procedure will prevent such a mistake as the one above quoted from happening:

1. Cleanse the nasal fossa as thoroughly as possible by means of syringing with a warm lotion, such as boracic. The importance of this step is evident, for on washing out an antrum, pus in the nose coming from some other source might be wrongly ascribed to the antrum.

2. Explore the antrum through the inferior fossa of the nose; if it is found to contain much pus and there is a carious molar in its floor, the stump should be drawn, the alveolus drilled, and the antrum drained through the alveolar opening.

3. If the nasal discharge is only slightly lessened by this treatment, accompanying suppuration elsewhere should be suspected, firstly in the ethmoidal cells.

4. Treat the ethmoidal cells, and it is often well at this stage, especially if polypi are present, to remove the anterior half of the middle turbinate bone and later on the posterior half; if after treatment of these cells the discharge is not stopped, it is highly probable that the frontal sinuses are the source of the suppurative process, but the sphenoidal sinus should always be remembered as a possible source of trouble.

Details of the above procedure will be given under treatment.

(To be concluded.)

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A CLINICAL LECTURE

ON

PARALYSIS AGITANS.

Delivered at the National Hospital for the Paralysed and Epileptic, Queen Square,

By J. A. ORMEROD, M.D., F.R.C.P.

GENTLEMEN,—The name of this affection illustrates how different people may view a name from different standpoints. Sir Thomas Watson says, "what has badly been called shaking palsy, paralysis agitans; badly because paralysis agitans is another example of a hybrid name;"—he had been speaking of locomotor ataxy—"and because there is in truth no paralysis at all." On the other hand Sir William Gowers says, "shaking palsy is one of the best names which has been conferred upon any disease; it is an instance of a name based upon the simple features of the disease," etc.

Of the two opinions I think most of us will agree with Sir William Gowers. Although there are some cases in which there is not very much paralysis, and others in which there is not much shaking, still the bulk of the cases are well described by the name which has been given to the disease.

There is nothing definite to be said about the morbid anatomy of this disease. Various lesions have indeed been described, but none of them, so far, seem to be universal and common to all cases. In some it seems that no morbid change whatever has been found.

As regards the ætiology we do not know very much, but there are some factors which seem very commonly to precede it, and I suppose in some way produce it, though in what way is not obvious. The most common thing is to hear that the patient has been exposed to some continuous mental depression, produced, say, by business worries, family anxieties, illness and death of relatives, and so forth. Other cases seemed to arise after prolonged exposure to damp and cold. In some rather rare cases there is a history of some acute mental shock, thus, instances are re-

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corded of the disease coming on after fright. Then, again, it is possible that some acute specific diseases, if they do not produce it, may at any rate make it much worse. Influenza must be specially mentioned in this connection. Some patients with paralysis agitans say that influenza made their condition very much worse, and others distinctly assert it caused their trouble. Lastly, it is a disease of advancing life, coming on usually about the age of fifty or thereabouts.

Symptoms.—These are on the whole simple. The three main points are the tremor, the peculiar facies of the patient, and the progressive weakness. The characters of the tremor are diagnostic in most cases. It is a rhythmical tremor, that is to say it is regular in time and amplitude; and a coarse rather than a fine vibration. It has another character, namely, that it is present while the patient rests his limb, and is stopped when he tries to make any effort. This fact is often said to be diagnostic of the disease, but unfortunately for diagnosis there are exceptions to the rule, and in some cases of paralysis agitans the tremor is not stopped by voluntary effort.

It is apt to affect certain special parts, the fingers and hand particularly, and next in frequency the lower limbs. It most commonly begins in the fingers and hand of one side, and may spread either to the leg of that side, or to the fingers and hand of the other, till finally all the limbs are affected. It has been said that the head never shakes in paralysis agitans, but it does sometimes, and so may the lips and tongue. Patients not infrequently say that "their insides shake like their limbs." It may be that there is some shaking going on in the abdominal muscles, which reminds them of the shaking in the limbs. One patient told me that "her brain shook like her limbs;" it is difficult to see what this could mean.

One may conveniently consider here some of the clinical varieties of tremor, because it is largely from this symptom that the diagnosis of paralysis agitans is made. The peculiar tremor I have described—viz. rhythmical, moderately ample, vibration, which is stopped by voluntary movement—is almost characteristic of paralysis agitans. There is another kind of tremor which is very fine in its vibration, rather rapid, and generally more marked when the patient holds his hands out in front of him than when the hand and arm are at rest in an easy position. You find this in a variety of nervous diseases, for instance in Graves' disease, in alcoholism, in general paralysis, and not infrequently in hysteria. There is a third kind of tremor which is very different—still it is generally compared in books with that of paralysis agitans,—namely, the tremor of disseminated sclerosis. As you probably know, the characteristic of this is that the limb does not shake when at rest, but directly the patient tries to use the limb it shakes. This shaking when well marked is not a rhythmical tremor, like that of paralysis agitans; it is irregular, both in the frequency of the vibration and in the amplitude, and it is far coarser than the tremor of paralysis agitans, being in fact more an irregular agitation of the limb than a true tremor.

There are other kinds of tremor which are difficult to classify. Sometimes in hysteria you may find a tremor rhythmical and fairly ample, like that of paralysis agitans. "Senile tremor" is also very similar. But neither of these kinds are stopped by voluntary movement, as is the tremor of the most typical paralysis agitans.

The next point is the facies or general appearance of the patient. The face itself is characterised by immobility of the features, and absence of expression; it has been called the "starched face." The exact cause of this is not known; it may be due to rigidity of the facial muscles, or it may be due to partial paralysis of them. The neck also looks stiff, and the patient rarely turns his head from side to side. The head and body are bent forward, the arms are held in front of the patient, and the fingers kept in the "interosseal position," *i. e.* flexed at the metacarpo-phalangeal joints, straight at the other joints. The gait is very peculiar; the patient generally takes short, hurried steps, tends to drag his feet, and looks as if he were falling forward. Sometimes he has difficulty in starting, or, on the other hand, in stopping himself when started (propulsion). Or, if started backwards by a slight push, he may be unable to stop going back (retropulsion).

The immobility of paralysis agitans is not exactly a muscular rigidity in the sense of resistance to passive movement, such as you see in contracture of the limbs after paraplegia or hemiplegia, but there is, no doubt, a sort of analogy between the two states, and, indeed, in some advanced cases

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of paralysis agitans there may be actual contracture.

Sometimes early in the disease there are spasmodic contractions of the limbs. This is a symptom to which attention was first drawn by Dr. Purves Stewart. In the history of several cases he found a peculiar symptom, namely, that the patient had been subject to a contraction of the toes which made them flex or curl up under him, so that he was liable to be thrown down. This symptom, which passed off after a time, proved to be the precursor of paralysis agitans. His statement brought to my mind forcibly a case which I had seen here. A man was sent up to me by Dr. Norman Rushworth, of Walton, for this particular symptom. He said that when he tried to walk any distance his toes curled underneath him, so that he nearly fell down. I could not make anything out of this at the time, and I had to confess my ignorance of what it meant. Two years afterwards, however, he came again with the typical appearance of paralysis agitans. In looking through my old notes, I find this symptom is not so infrequent as might be imagined. For instance, a woman who had paralysis agitans said that her right toe used to draw up. Another case, a man with paralysis agitans, has had the hand and fingers drawn up. Another woman said the two middle fingers of the left hand sometimes became crossed, or the thumb and forefinger became crossed. All these statements were volunteered, not given in reply to leading questions, because I did not then know of this early contraction, or, at all events, of its significance.

As regards the facies of the patient (taking the word in rather a loose sense), one ought to include the voice. The voice is often peculiar, and is somewhat difficult to describe. It may be said to be a high-pitched pipy voice, or a monotonous whisper. You will see that there are many features about these patients like those of old age. It has been remarked by Dr. Buzzard that probably the old man of the stage was drawn from cases of paralysis agitans.

A third principal symptom, about which it is difficult to say much, is the weakness. It is most likely that there is a true loss of muscular power, although that has been denied by some physicians. Not infrequently patients will come here month after month, and say that the shaking of which they originally complained has diminished and got much better, but that they get weaker and weaker, until at last they cannot come any more.

As regards sensory symptoms, there are very few, except pains. Pains are very often a prominent symptom. Patients talk of aching pains, chiefly in the neck and loins, and not infrequently in the limbs also. As far as I know there is no sensory paralysis. Sometimes patients complain of a certain numbness, which might lead you to think there was sensory paralysis, but I do not know of any case in which there has been definite anæsthesia.

There are certain symptoms which may be classed as vaso-motor. Patients have flushes of heat, or appear to be abnormally sensitive to heat and cold. On looking over my notes, I find there are other symptoms which are possibly of this class, such as swelling of the limbs, or discoloration, coming on apparently without any cause. For instance, one of my patients, a man who was under observation four years, used to tell me that his face swelled occasionally, and that the hand most affected swelled up. The other hand became spotted and purple. One woman said her hand used to swell. One man had œdema of his left ankle.

The skin reflexes and the tendon reflexes are generally normal; but in some cases of paralysis agitans the tendon reflexes are exaggerated; this may occasion some doubt as to diagnosis. As a rule there are no mental symptoms of any severity; indeed, it was part of the definition which Parkinson made of the disease, that the mind was unaffected. But undoubtedly in some instances the sufferers have become maniacal, though this is not common. There is often sleeplessness and great restlessness by night and by day. Some of you may remember that this was recognised by Charcot, and he undertook the treatment of keeping the patients continually on the move.

The tremor and the peculiar facies are usually the first striking symptoms. Tremor may, in some cases, be absent; or, in the early stages, the disease may be without the peculiar facies. It is in such early stages of the disease that the difficulty of diagnosis comes in.

As regards prognosis, the disease nearly always progresses slowly from bad to worse.

We know of no means of curing, or even ar-

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resting, paralysis agitans. Tonics, such as iron, arsenic, or strychnine, are generally appreciated by the patient. Hyoscine sometimes arrests the shaking; sedatives may be given for the sleeplessness, but the disease will continue its advance.

I will now show you a few cases. The first case is that of a man, an in-patient, under Dr. Hughlings Jackson. You will see at once that he is a very fairly typical illustration. He is a bricklayer, and his age is fifty-eight. The shaking is very characteristic. The pose of the fingers is more or less of the interosseous type. The fingers do not roll very much on each other, as is often the case, but there is rather an affection of the muscles of the forearms, causing flapping to-and-fro movements of the hand. You notice the diminution of the tremor when he holds out his hand. His face is rather impassive. His pose is not very characteristic. He inclines his head forward, but he does not shuffle. He has been ill three and a half years. First of all he began to feel very tired, and later on he had a slight tremor of his right hand, and slight weakness of the left hand. More lately the left hand showed a little tremor, and he found his head was unsteady. His legs do not shake. Thus the affection began in one hand, and then crossed over to the other. This patient's tongue is pretty steady, and you will notice the low-pitched voice. The tremor is stopped by exertion. The best example of the tremor being stopped by voluntary movement which I have seen was that of a quondam soldier who attended with this disease; his shaking was much more violent than anything I have seen, but it was completely stopped by voluntary effort; so much so, that he could shave himself quite clean. I remember once sitting next to a lady at dinner, who appeared to have paralysis agitans affecting her right hand, but she was, of course, anxious to conceal the fact. When she used her knife and fork there was no shaking at all, but the difficulty was what to do with herself while she was not so engaged. She solved the difficulty by holding a fan, so that the involuntary movements were utilised and made to appear purposive.

I will now bring forward some cases of tremor which are in contrast to paralysis agitans. Here is a woman aged seventy-three, who has been attending here for ten or twelve years in the out-patient room. Her complaint began with a certain amount of pain down one arm, accompanied by a fine tremor, and the diagnosis was then difficult. For a long time I had no idea of what was the matter with her; but her tremor became worse, and gradually assumed the character of that found in disseminated sclerosis. Perhaps you will think disseminated sclerosis unlikely in an old lady like this, but the peculiar tremor, and an affection of speech, both of which have gradually developed, support that diagnosis. Her hands are quite steady when she is not making any movement, but when she tries to pick anything up you notice the violent tossing movements, unlike anything seen in paralysis agitans. She cannot lift a cup of tea to her mouth. She says her legs tremble very much when she walks, but she can both walk and stand. When she speaks she separates the syllables of the words, the "staccato" speech, as it has been called. On the other hand, she has no nystagmus, and the tendon reflexes are not exaggerated. This last fact is certainly unusual.

The next patient, a man, has a tremor which I am at a loss to explain. He did not come to be treated for this, to which he pays little heed, but simply for constipation. His age is seventy-two, and he is a labourer. You notice an ample and tolerably rhythmical tremor in his hands, but unlike that of paralysis agitans, in that it is decidedly increased when he holds his hands out. No part shakes except the hands. His gait, you will notice, is not that of paralysis agitans, for he steps out very fairly. Neither is the face immobile. If he had paralysis agitans, I think by this time he would have had a more characteristic facies. For want of a better name I call his condition one of senile tremor.

In the next case there is no doubt about the origin of the tremor. It is a mercurial tremor. He is a thermometer maker, and has worked at the trade for many years. He has had the shaking for thirteen years. The cachectic look of the patient is not due solely to the mercury, but to the fact that the unfortunate man has phthisis. There is a certain amount of shaking when the hands are not performing voluntary movement. This is slight, but when he stretches out his hand to reach an object a violent agitation begins. Thus the tremor is more like that of disseminated sclerosis than that of paralysis agitans. Indeed, the resemblance between disseminated sclerosis

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and mercurial tremors is rather striking. Not only is there the tremor, but there may also be exaggeration of the knee-jerks, and even a certain affection of speech. In some cases which I have seen there has been a little nystagmus, and a mental condition which is not altogether unlike that of some cases of disseminated sclerosis.

We do not now see so many cases of mercurial poisoning as we did in times past. The cases I see are nearly all in people who are clinical thermometer makers. They have to heat the mercury in the tube, and then seal it while hot, so that they inhale the metal in the form of vapour. Iodide of potassium is the medicine which they administer to themselves for it.

Here is a man whose general appearance is quite characteristic of paralysis agitans. He has attended under me for many years; I am sorry to say he gets worse. He has very slight tremor. The position of his fingers is typical. His neck is stooped forward and held stiffly; I do not think he has moved it since he has been in the room. As to his gait, he has much difficulty in starting, standing motionless for nearly a minute before he can get off; he takes short dragging steps, leaning forward all the time, and sometimes has to run forward to save himself from falling. He appears to have difficulty in altering his direction; indeed, he can scarcely turn to the right, and even in turning to the left has to make a very wide sweep round. Although his limbs appear to be stiff, this is not a rigidity like that of a lateral sclerosis, for you see I can straighten his arm much more easily than I could in the case of an hemiplegic with old contracture.

The next patient is a man who is now in the hospital. He has attended as an out-patient for some time, and he appears to be in an advanced stage of paralysis agitans. Here there is a really marked rigidity of the lower limbs. He has a rather impassive face, though perhaps that feature is not so marked as in the last case. There is some tremor of the left hand. This tremor has been worse than it is at present. He also has the peculiar quiet way of speaking which many of these patients have. His ankles are quite stiff, and he cannot walk at all. The knee-jerks are rather difficult to elicit, because of the rigidity, but they are present. He has been affected for four years, and he has formerly had pains all over, and shaking in both arms. There is no very definite history as to the cause of the disease, but, like many patients, he ascribes it to catching cold while working in a damp shop.

I will now show you a case which is an uncertain one. It resembles paralysis agitans in some points, but it does not in others. The patient is forty-one years of age, and lives in the country. The points in which it resembles paralysis agitans are that he has a peculiar stolid expression, and he has a certain amount of tremor. This tremor began on the left side. His voice is whispering, and there the resemblance ends. But he has another symptom, which is not usually found in paralysis agitans, namely, wasting of his muscles. You see how the first dorsal interosseous is wasted. There is also wasting of his legs, and you notice a very peculiar pose of his feet, recalling certain cases of peripheral neuritis. The position of the legs is complicated by the fact that he has got enlarged and thickened joints, probably from osteo-arthritis. We cannot obtain his knee-jerks. I have never seen the feet in that position in paralysis agitans. I think very likely the wasting of the muscles in the legs is connected with the arthritis in his joints, but it is difficult to frame a complete and exact diagnosis.

TWO LECTURES ON IMMUNITY.

Delivered at Guy's Hospital Public Health Laboratory,

By WALTER C. C. PAKES, D.P.H.Camb.

II.

GENTLEMEN,—Last week I was telling you about immunity, natural and active, and I was explaining to you the way in which an active immunity is either acquired or given—acquired speaking of one's self personally, and given in the case of animals or other patients. The manner of producing active immunity will be the subject with which we shall commence to-day.

Diseases which are caused by micro-organisms may have their effect either on account of the number of bacteria, or on account of the toxins or poisons which these bacteria produce. If you kill such an animal as a guinea-pig with anthrax, it will die of true septicæmia, and you will be able to find enormous numbers of the bacteria actually in the blood, and you will be able to

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see that the smaller capillaries are choked up with bacilli. So much is this so, that it was thought at one time that death was due to the mechanical obstruction caused by the bacteria. But that has recently been found not to be the case, because it is possible with anthrax, as with diphtheria, to kill with the poisons of the dead bacilli, or with the filtered toxins. So now we must accept as a fact that the chief lethal agent in disease is not the bacteria themselves, but the toxins which they produce.

In the case of pneumonia this is very well exemplified by the crisis. You know that when a person gets pneumonia he goes on for four or five days with a high temperature, a running pulse, and with all the symptoms which you know belong to pneumonia. But on the sixth day, or sometimes on the seventh day, he goes through a crisis, after which the temperature comes down; and although he is not then well, he is very much better. Now if the disease was caused by bacteria themselves, you would expect to find that the bacteria had disappeared from the lung. This is, however, not the case, bacteria at this stage being still present in the lung in the same quantity as on the fifth day. But something has happened, so that the toxins which are produced by these pneumococci in the lung are no longer able to produce any effect.

The inference is that animals can be inoculated, and an active immunity obtained by careful injections with the toxins. This has been found to be the case. Now toxins, generally speaking, may be said to be of two kinds, *intra-corpuscular* and *extra-corpuscular*. The latter are produced in artificial media by some bacteria, such as those of diphtheria and tetanus, and are present in the medium after filtration through a Pasteur-Chamberland filter, although it can be proved that no bacteria have come through the filter. We therefore conclude that the toxin is in solution, and not in the bodies of the bacilli. For this reason it is called extra-corpuscular. The typhoid bacillus fails to produce (at any rate in artificial media) these powerful toxins. But it is found that there are toxins produced, and these are present in the bodies of the bacilli, because you can produce a poisonous, or even lethal, effect by inoculating a sufficiently large number of the dead bodies of the typhoid bacilli into a susceptible animal. Now as organisms such as typhoid bacilli do not produce an extra-corpuscular, but, as they produce a lethal effect by inoculation of their dead bodies, we conclude there must be an intra-corpuscular toxin. This fact, of course, affects the immunising of animals against different bacteria in a very marked degree. In the case of diphtheria and tetanus an active immunity can be produced by inoculating gradually increasing doses of the pure toxin. In the case of typhoid this cannot be done; so increasing doses of organisms of different degrees of virulence are injected into the animals in proper sequence, so that they have a constantly increasing dose of the intra-corpuscular poisons. Now this immunisation by toxins, either extra- or intra-corpuscular, has been used not only for the purpose of immunising animals, but as a prophylactic in the human subject against certain diseases. You will remember I said that vaccination was really an injection with attenuated virus; that is to say the organism was not killed. But now we have another method of preventing such specific infective diseases as smallpox, by injecting into the persons who are likely to come under the influence of the infection some of these toxins. In the case of cholera we have an instance, as I said yesterday, like vaccination, where the actual organism is alive, but attenuated; and that, as you know, is practised by Haffkine in India as a prophylactic against cholera. In the case of other diseases, like enteric fever, the prophylactic is of a different nature. Living bacilli are not introduced, but a certain amount of what is called vaccine. This is not a serum, but consists of a certain amount of the killed culture of the organism. In the same way plague may be treated, and the killed cultures may be inoculated into the bodies of persons likely to come within the environment of the plague. This is presumed to produce an active immunity. In both these cases you are producing an active immunity by an intra-corpuscular toxin, and there is no doubt that by a proper modification of the extra-corpuscular toxins—that is to say by putting either minute doses of diphtheria or tetanus toxin into the human being—you would be able to produce an active immunity, which would prevent persons from acquiring the disease. But these toxins are extremely virulent, and I take it that it is somewhat dangerous to try anything but the minutest doses; and these minute doses will probably not be sufficient. The

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consequence is that, in order to procure an efficient prophylaxis, many injections would have to be made, as in the case of animals to which we wish to give a high degree of immunity.

If any animal or person suffers from a disease such as typhoid fever or diphtheria, he or it acquires a certain immunity. This immunity may be, as I said yesterday, either lasting or merely transient; but the immunity acquired by an ordinary attack of the disease is never anything like so high as that which is acquired by artificial immunisation by consecutive injections. One can put this numerically by way of illustration. It is found that you can give a rabbit as much pneumococcus, after a series of immunising injections, as would kill something like 200 normal rabbits; and in that case you can say the first rabbit has acquired an immunity of 200 × 400—*i. e.* 80,000. If that rabbit were susceptible to pneumonia in the ordinary way, it would not, perhaps, be able to get an immunity of more than 400 × 20, or 8000. This has a very important bearing on what I shall say subsequently about passive immunity.

But before I pass on to this subject we must see what has been done whilst conferring an active immunity upon these animals. In the first place, what difference is there between the normal person and the person who has acquired an immunity? As we already know, there is a considerable difference in the serum, as evidenced by certain reactions, which we have already considered, namely, Pfeiffer's and Gruber's. If you take a normal serum, or a serum from a normal patient, and mix it with adequate proportions of a cultivation of the typhoid bacillus, you will get little or no effect; the bacilli will swarm about as if they were in their own original broth. But if you take the serum of a patient who has suffered from enteric fever, or, better still, the serum of an animal which has been rendered immune against this organism, you will see a different picture. The bacilli, instead of floating about, have lost their motility, are aggregated together in herds, and are apparently dead. That is found to be the case in the blood-serum, and, as you know, in Pfeiffer's reaction it is the case with the peritoneal fluid. Something has happened to the serum of this immune animal—something the effect of which we can see, and the result of which we can probably conclude.

If you take a guinea-pig which is not immunised against such a disease as cholera and inject into the peritoneal cavity a certain number of cholera vibrios, you will very soon find that there is a marked increase in the cholera vibrios, and no sign of leucocytosis in the peritoneal cavity. If you take an animal which has been immunised, or partially immunised, you will find, first of all, that the vibrios do not increase, or not markedly. They very soon lose their shape and individuality, and become the little rounded masses described by Pfeiffer. Later you will see there is a very marked leucocytosis, and very soon after this there is a disappearance of these bodies from the peritoneal cavity altogether.

Now let us again refer to pneumonia. As you know, a patient practically becomes well after the crisis, that is to say, after the fever has gone; the patient is then often merely weak. What has happened during these six days that the effect of the toxin should suddenly disappear? First of all, the toxin which is produced by the pneumococci locally has invaded the tissues and blood, and caused poisonous symptoms. Meanwhile it has been doing something else; it has affected the tissues, and has caused them to produce some peculiar body or substance, which has a neutralising effect upon the toxin. These substances, whatever they may happen to be, are called by the Germans antikörpers (the körpers being the toxins, and the antikörpers the bodies which neutralise the toxins). By the production of these bodies any toxin which is present in the body and blood of the animal is neutralised. A sufficient quantity is produced, and remains for some time, thus preventing any effect being caused by the production of further toxins by the pneumococci. These antikörpers are really the antitoxins, but the word antitoxin is used in another sense, and one prefers to call them antikörpers.

The question which arises is, is the production of the antikörpers the reaction of infection or the reaction of immunity; that is to say, is the production of the antikörpers the effect of the poison in the body, or is it the effect of Nature's attempts to get rid of the toxins? In other words, is it the first step of immunity, or is it simply a sign of the infection? The evidence goes to show that it is the reaction of immunity, and for this reason. Wright, who is responsible for the typhoid vaccine, has suggested that these bodies should be called

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glutinins. The reason for considering that it is a reaction of immunity is that in accordance with the degree of immunity which is acquired in an animal by a dose of the toxin, so are the effects which we know as agglutination increased. We know it is the case with typhoid fever in the human being. Widal's reaction, which is used for diagnosis of typhoid fever, may be absent from the blood of a patient who has really got clinical typhoid fever, and has had it for several days. It is well known that this reaction probably does not come on until the fourth, fifth, or even the sixth day. As the disease progresses, so often does the agglutinating power of the serum become greater. Now, if you inoculate an animal with the same organism, the typhoid bacillus, according as it acquires a higher degree of immunity, so does it acquire a greater agglutinating power. Whether the glutinins—that is to say, the substances which actually agglutinate—are the same substances as those which neutralise the toxin is not certain, because one does not know either body; but there is no doubt that the two, in those diseases where agglutination is observed, are produced together. Hence Wright's suggestion that they be called glutinin, the reaction being one of immunity.

In order to prove this he performed some interesting experiments, which had very important results. In the first place, it has been found that one of the causes of relapses in enteric fever is probably the fact that the typhoid bacilli are present in the spleen. Wright said that if this is a reaction of immunity, as the bacilli are found in the spleen, that ought to be the spot where there are less glutinins than in the ordinary blood-serum. Therefore he compared the agglutinating power of the blood-serum and spleen-juice of cadavera dead of enteric, and he found in every case the agglutinating power of the spleen-juice was less than that of the blood-serum. He thought the spleen got rid of the antikörpers, and therefore enabled the typhoid to go on growing in this one isolated spot in the body. He further found that the serum around the typhoid spots had less agglutinating power than the serum which he got from other parts of the skin, which showed no spots, or from the blood-serum itself. So that these glutinins do seem to be the result of nature's attempt to get rid of the poison, and, of course, it helps to explain what we are doing when we are either acquiring or producing an active immunity. We give the animal a modified form of the disease, or we inject it with the poisons that are given off by the bacteria which produce this disease. We give them in small quantities, not sufficient to kill the animal, but just sufficient to arouse the tissues to activity. The tissues begin to form the antikörpers, or attempt to form them, directly the poison has obtained entrance, and they get rid of the poisons by producing the glutinins, and so neutralising them. Next you put in a larger dose, and more of the glutinins are produced, until there is a very considerable quantity in the body. When you get this considerable quantity of glutinins in the body you can put almost any quantity—certainly any quantity which you get naturally—and there is the glutin there ready to neutralise the toxin, and so to prevent its poisoning the organism.

This antitoxin does more than merely neutralise the toxin; or, at any rate, it is probable that it does. One of the reasons why the production of active immunity in this way is efficacious probably depends on the fact that, as there are glutinins in the body, any toxins which are absorbed in the body are neutralised, and more, that the bacilli themselves are rendered harmless towards the organism, and are merely extraneous bodies to be digested by the phagocytes or leucocytes, or dissolved by the body fluids. This is borne out by certain experiments which have been made. It is shown that if you inoculate a guinea-pig with cholera vibrios, and at the same time inoculate it with the anti-cholera bodies produced in another guinea-pig—that is the antitoxin serum of which I shall speak,—the first thing that happens is that the bacilli begin to grow without any phagocytes (provided there is not sufficient glutinin to completely neutralise the toxin). Now if you put further doses of the serum you neutralise the toxin, and then the next thing that happens is that you get the leucocytes coming down upon the organisms; they englobe and digest them. With more antitoxin, or under different circumstances, the vibrios become round, and are simply dissolved. Therefore we may say that in the production of an acquired immunity we have either acquired or produced a stock of antikörpers or glutinins wherewith to neutralise any toxins which may be subsequently produced by the in-

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vading micro-organisms, and as this happens, the patient becomes immune from effects following an ordinary dose. This, then, is active immunity.

And now we will pass on to consider *passive immunity*. When an animal has been highly immunised against a certain micro-organism to which it is susceptible, it is found that its serum has the property of being able to neutralise the toxins in its own body. Bordet found that it had also the property of neutralising outside the body, and he found that if you take a certain amount of toxin, enough to kill a guinea-pig, and take some serum from a guinea-pig which had been immunised against this organism, and mix them together outside the body, and inject them into the normal guinea-pig, there is no effect. That means that the serum of this animal which had been immunised against diphtheria had really, in a way, chemically neutralised the toxin in a glass test-tube. This, of course, gave rise to a series of experiments, which have resulted in the curative treatment of certain of these diseases. If you get an animal suffering from a certain disease which produces certain toxins, and in consequence symptoms, and inject some of the serum containing the glutinins of the same organisms, you will neutralise all the toxins that are floating about in the body, and therefore in a large measure cure, or, at any rate, modify the disease. When you do this, especially if you succeed in completely curing the disease, you have conferred a passive immunity upon the patient. The difference between active immunity and passive immunity is this: in active immunity you cause the body itself to produce its own antikörpers or glutinins. In the case of passive immunity you add to the body the glutinins which have been manufactured by another animal; you add the glutinins from an animal which has been *actively* immunised against the organism.

Now the application of this immunity, both active and passive, to everyday medicine is, of course, interesting, and is nowadays extremely important. I have indicated to you how an active immunity can be produced, but I should like to here, again, make a few remarks upon the amount of immunisation. In the case of smallpox, vaccination produces immunity for a certain period, and I think we may again graphically represent this in the way I suggested yesterday. Supposing we have a line here of absolute susceptibility, if there is such a thing, and we have again our 400 as the line of virulence (*i.e.* the number of germs multiplied by the virulence of each); in other words that smallpox has a poisonous effect which we call 400. Children born into this country, in the first six months apparently have an immunity which is above that 400, because so few acquire it during the first six months of life. In the course of two years it comes down to the 100 line. You vaccinate this child, and its immunity goes up to 900 at once. But the antikörpers which have been thus produced do not persist indefinitely. Although the organism has got into the way of producing these antikörpers, after a lapse of time it begins to fail in its duty and the amount of anti körpers decreases. The line of immunity may, and probably does, fall to a point below the 400 line, but not as low as before vaccination. After several years the patient is again below the line of ordinary smallpox susceptibility, and therefore he may contract smallpox, although the chances are that the attack may not be so severe as if he had never been partially immunised. He is again vaccinated, and the immunity goes up to 1200. In the course of years that line probably falls to 600. If you vaccinate a third time, after the end of twenty-five or thirty years, the line will go up to, say, 1800, and will not again fall below the 800 line. There is no doubt some of these people do get smallpox notwithstanding that they may have been vaccinated three times. In that case we must presume that, the virulence being the same, the dosage must have been considerably more, and is probably in the person of one who has been attending on the smallpox patients.

If this is the case, and the glutinins did disappear, one would expect them to disappear in those diseases which give a sign of their immunity, as in the case of enteric fever. And this is exactly what happens. After the convalescence from typhoid fever you may get the agglutinating power of the serum, so that ·2 per cent. of serum will agglutinate the organism. After the course of six months you may get ·5 per cent., after a year 1 per cent., and after five years it will not agglutinate at all. Put graphically it means that when the patient has had typhoid fever his line of immunity goes up, and then gradually comes down, so that at the end of a certain time

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it has no agglutinating power. Agglutinating power and immunity probably go together, but the agglutinating power disappears long before the actual immunity does, that is to say the effect outside the body is lost long before the effect inside is lost. The neutralising power of the serum of a horse which has been rendered very highly immune against diphtheria toxins gradually diminishes, so that a horse may yield a serum which contained 100 units of antitoxin per c.c. to-day, but the serum of the same horse six months hence may contain only 50 units per c.c. So it is quite legitimate and reasonable to vaccinate and re-vaccinate, and if necessary still re-vaccinate.

When we come to confer an artificial immunity from another disease, such as typhoid fever, we ought really to procure as high a degree of immunity as possible; or if the patient is likely to go, after the lapse of a certain time, into typhoid infected districts, he should be again injected with the dead bodies of the bacilli, so as to procure a high immunity, because although he may have been rendered immune previously, the immunity may have decreased, and he will require a further inoculation in order to keep him far above the line of infection. Wright himself suggests that certainly two inoculations should be made after the lapse of ten days, and some results have been published regarding the effect of this against typhoid in South Africa. Very few of the soldiers were vaccinated twice; that is to say, their immunity was only slightly increased. When, therefore, they got to places like Pardeburg, where the virulence was very high, they were found not to have a sufficiently high immunity to prevent them acquiring the disease.

Active immunity, you will see, is used as a prophylactic; it is probably useless as a curative agent, because if the patient has already acquired the disease and is trying to produce his antikörpers, the addition of more toxins may just finish him off, and he may not be able to produce antikörpers in time. The conferring of passive immunity is of great value, because it actually adds to the body the necessary glutinins which the body wants.

This is a curative agent, but it must be remembered that even in this case the glutinins only neutralise the toxins which are floating about in the body, and these may have produced their effect before one inoculates the serum. There is no doubt that these toxins have a selective affinity. In the case of tetanus you can actually neutralise the toxin by a sufficient quantity of brain substance; that is to say, the toxin has a peculiar affinity for some of the brain-cells, or enters into a chemical combination which ruins the cell. If that cell is ruined, no amount of antitoxin will be able to put it right, because the damage has already been done. To give a chemical illustration:—If you have a solution of barium nitrate, and you add to it a solution of sulphuric acid, you will get barium sulphate. Having produced the barium sulphate, no amount of sodium carbonate will convert this into barium carbonate.

The practical application of the serum treatment in medicine is this:—Directly you suspect the disease for which there is a serum provided, inoculate at once, so as to neutralise the toxin before it can combine with the cells, or whatever part of the tissue of the body for which it may happen to have a predilection.

Now the passive immunity may be produced by the serum, and will be sufficient, at any rate for a certain time, to act as a prophylactic. When the serum is injected into the body, the antikörpers are present in the body, and they are not excreted immediately; but the body itself has not been trained to produce its own antikörpers, and therefore it is only those which you put into the body which are acting, and directly these are eliminated you have the body in the same state as originally. It is possible, therefore, to use the serum as a prophylactic, but only for short periods, and it is quite reasonable treatment, if you fear an epidemic of diphtheria in a school, to inoculate the whole of the children with this anti-diphtheritic serum, because by that means you will probably introduce sufficient antikörpers into their bodies by this method to prevent them acquiring an attack of the disease; that is to say, they will be given an immunity sufficiently high to combat the ordinary virulence of diphtheria which is contracted in the usual way.

The difference between the active immunity and passive immunity as a prophylactic is, that the body takes a long time to get accustomed to produce its antikörpers when it has had the actual toxins to deal with, and therefore the active immunity may last for months or years. (In enteric this immunity probably lasts thirty or forty years,

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and we think this is so because second attacks are so very rare.) In the case of passive immunity, the immunity only lasts so long as the antikörpers which you put into the body remain in it. The body has acquired no property or capability of manufacturing these sera or antikörpers upon its own account.

CHRONIC SUPPURATION IN THE NASAL SINUSES; ITS DIAGNOSIS AND TREATMENT.

By A. S. COBBLEDICK, M.B., B.S.Lond.,
Late Senior R.M.O., Golden Square Throat, Nose, and Ear Hospital.

(*Concluded from p.* 352.)

THE foregoing remarks give a general idea of the best methods of forming a differential diagnosis, but before passing on to treatment the following points of interest with regard to antral disease and a recapitulation of the symptoms of suppuration in each sinus, even at the risk of repetition, will be of service.

There are two varieties of chronic suppuration in the maxillary sinus, viz:

1. Those cases which are associated with nasal polypi, with or without the presence of carious upper molars.

2. Those cases unaccompanied by nasal polypi, but associated with carious upper molars.

It is quite surprising when the nose is examined as a routine practice, how very common antral suppuration is, and how frequently it is found quite accidentally, the patient apparently being quite unaware of his condition; in my experience this class of case has usually its origin in carious upper molars, and under treatment they do much better than the cases associated with polypi; in fact quite a large percentage can be cured without a radical operation.

Cases of antral suppuration associated with polypi usually produce nasal obstruction, discharge, and not unfrequently pain, and it is these cases, which are usually so difficult to cure even with a radical operation, especially when they are of long standing.

A few words may be said with regard to transillumination of the antrum, which has of late become a fashionable method of diagnosis; it is not of much use, and is certainly not indispensable.

If, in a suspected case of antral disease, the transilluminator is used and both antra are well and equally illuminated, then it may be usually inferred that the antrum is not the seat of the discharge; but not always, for the antrum may have recently emptied itself; if this is not remembered mistakes will undoubtedly be made. If, on the other hand, one or both antra are dark on transillumination, one has to differentiate between fluids or solid growth in the antrum or extremely thick antral walls.

Transillumination is of some use if used in conjunction with the exploratory puncture; *e.g.* on exploring the antrum and finding no pus, if the explored antrum is quite dark on transillumination, it would suggest solid growth in the antrum, but in most such cases other symptoms would render a diagnosis fairly easy.

In slight cases of antral disease there may be no symptoms, and nothing abnormal may be seen on inspection of the nasal fossæ; accidentally a bead of pus may be seen in the middle fossa, or after lowering the head between the knees a considerable amount of pus may pass from the antrum to the middle fossa; the possibility of this pus coming from the frontal sinus should not be overlooked; nevertheless, the discovery of such a condition of things should be followed by exploratory puncture of the antrum.

In more troublesome cases associated with polypi there is always nasal obstruction on the affected side, and at times attacks of supra-orbital pain, usually of a neuralgic type; pain is a very unreliable symptom, and may be confused with that caused by frontal sinus suppuration.

Conditions very suggestive of antral suppuration are a very large middle turbinate bone, a large bulla ethmoidalis, and a swelling of the mucous membrane in the middle fossa near the ostium maxillare; either of these conditions, associated with pus in the middle fossa, should first of all suggest antral suppuration.

Ethmoidal suppuration does not usually occur without accompanying antral or frontal sinus suppuration, unless at a very early stage. The following case shows that exceptions occur and that the difficulties of forming a diagnosis are often great. A young male aged twenty-six consulted

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me for nasal obstruction; his post-nasal space was filled with adenoids, and his right nostril was obstructed with pus and polypi; the adenoids were removed, polypi snared, and the antrum explored through the inferior fossa of the nose; the antrum was found to be clear. The middle turbinate bone was removed, but the discharge, if anything, became more profuse; the flow was paroxysmal and preceded by considerable pain. The ethmoidal cells were next scraped, although a definite diagnosis of frontal sinus suppuration had been made, largely on the very profuse discharge and its paroxysmal escape from the nares. A few weeks after the scraping the discharge and discomfort became very much less, and two months later all trace of nasal discharge had disappeared. This case well illustrates the fact that advanced ethmoidal suppuration may occur by itself, that the cells are capable of retaining a very considerable amount of pus, and that it is very difficult in many cases to definitely and accurately diagnose chronic suppuration in the frontal sinus.

Symptoms in these ethmoidal cases are not of much assistance; the appearances on inspection vary; slight and early cases show small granulation, not unlike a ripe raspberry in appearance, protruding from the outer wall of the middle fossa, and more or less bathed in pus; in more advanced cases the septa between the cells break down and loose pieces of bone may be discovered with a probe or forceps; when this stage is reached polypi are always present. If this condition remains untreated the tendency is for the pus to accumulate under considerable pressure, and to burrow forwards and backwards as well as outwards to the orbital plate; in fact, it is not at all uncommon in advanced cases for the orbital plate of the ethmoid to be laid bare.

In the case of frontal sinus suppuration, if there is pain present, it is either very severe and neuralgic in type or of a dull tense character; more frequently than not it is unaccompanied by any pain.

Uncomplicated cases are not common, for where there is no antral infection, the ethmoidal cells are almost always affected. But little reliance can be placed in local tenderness on pressure, or on the paroxysmal nature of the discharge.

From what has been already said it can be readily understood how difficult it is to make a diagnosis at once. If the discharge is unassociated with polypi it may be of antral or frontal sinus origin, and if associated with polypi it may be either of antral, ethmoidal cell, or frontal sinus origin, or any combination of these three.

Treatment.—If by the methods already indicated a nasal discharge is diagnosed as antral in origin, and the mischief does not clear up after washing out the antrum, a few times—either through the natural opening or through a puncture in the inferior fossa,—further treatment must be resorted to.

This is a fit place to shortly describe the best method of exploring the antrum through the inferior fossa of the nose:—Thoroughly cocainise the inner wall of the antrum by passing a piece of wool soaked in a 20 per cent. solution of cocaine into the inferior fossa, between the inferior turbinal and the antral wall; at the end of ten or fifteen minutes good local anæsthesia is produced. The instruments commonly used to perforate the antrum at this point are Lichtwitz's and Krause's trocar and cannula; the former is certainly the better; if these are not at hand, an ordinary aspirating *needle*, if of a good bore, may be successfully used.

If care is taken no unpleasant *contretemps* occurs; the forefinger of the right hand should be placed on the cannula about an inch and a half from the tip, so as to act as a stop, and so prevent the trocar injuring the orbital plate if any force has to be used. The point of the instrument is passed beneath the anterior end of the inferior turbinal, and directed upwards and well outwards; upwards, to ensure striking the *thin* portion of the antral wall, and well outwards to prevent the trocar passing between the bone and periosteum. An assistant steadies the patient's head, and the operator makes firm pressure upwards and outwards; as a rule no force at all is necessary, and a sharp characteristic click indicates that the antrum has been reached. The trocar is removed, and the cannula, which remains firmly fixed, is fitted with a tube and rubber ball syringe filled with lotion, *e.g.* boracic or weak alkaline; the antrum is washed out, the discharge escapes through the natural opening, is collected in a black kidney tray, and examined.

As a rule this minor operation is quite simple, but troublesome cases are met with at times:

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1. A very thick antral wall—even in its upper part—requires the use of a Krause's trocar; this instrument is much stronger than Lichtwitz's and is curved; using this curved instrument with force may surprise the surgeon, as if the antrum is small the trocar may pierce the anterior wall without his knowledge, and when fluid is injected it passes into the subcutaneous tissues of the cheek and produces a very unusual appearance; this has happened to more than one experienced rhinologist.

2. There may be no antrum, or so small a one that it cannot be localised; this is a very rare condition.

3. The inferior turbinate may be so wedged up against the antral wall that difficulty is experienced in passing the trocar in the right direction; if necessary the anterior portion of the inferior turbinate may be removed.

It is now generally agreed that all cases of antral suppuration should be treated for some weeks by irrigation through the alveolar arch, and there is no doubt that many cases can be cured by this method, especially those which have their origin in carious molars in the floor of the antrum; those cases which are associated with nasal polypi and ethmoidal disease nearly all require a radical operation.

The operation of drilling a hole into the antrum through the alveolus can be performed under nitrous oxide gas anæsthesia; first remove the carious molar with stump forceps, and then proceed to bore a hole through the piece of bone separating the tooth socket from the antrum; this piece of bone is thinnest over the outer compartment of the molar socket, and this one should be chosen. Sometimes the carious process has involved the floor of the antrum, so that an opening is already present, and the stump may be accidentally forced into the antrum; in other cases, where the bone is sclerosed, considerable force may be necessary before the antrum is reached.

Brunton's antral drill is certainly the best instrument to use, and it is well to have it in two or three sizes; not the least advantage of this drill is a screw stop to prevent the instrument being introduced too far, and so avoid injury to the floor of the orbit; it is also very strong, and its stem is of uniform diameter.

Another form of drill much in use consists of an obliquely grooved head-piece attached by a *narrow* neck to the stem, and unfitted with any stop; I have several times seen the head of this instrument left in the antrum, or firmly fixed in the alveolus, and when using considerable force the absence of a stop is obviously a disadvantage.

Whichever instrument is chosen, the smallest size should be used first, and the opening enlarged by quickly introducing the larger sizes.

It sometimes happens that the molars are quite sound, but that the second bicuspid is carious; when this is the case, and there is antral suppuration, it is well, after extracting the bicuspid stump, to attempt to make a communication with the antrum through the socket; this is by no means easy, and at times not possible. In attempting this the drill should be directed well backwards and outwards, and considerable force should be exerted. After a free opening has been made into the antrum through the alveolus, it should be fitted with a silver wire drainage-tube, so that the antrum may be washed out once or twice daily with a weak alkaline lotion.

If this treatment does not produce a cure, and if polypi, enlarged middle turbinate, and ethmoidal disease are present, these should be thoroughly treated before the the radical operation is resorted to.

A few practical hints as to the best methods of removing polypi, turbinates, etc., will be found useful. Not infrequently surgeons snare or remove polypi without any local or general anæsthesia; this is not fair to the patient, but it is certainly safer than the indiscriminate spraying of the nares with a 10 per cent. cocaine solution, a proceeding which should be strongly deprecated. All the severe cases of cocaine poisoning—not attributable to idiosyncrasy—which I have seen occur after intra-nasal operations, have been due to this method of producing local anæsthesia. The toxic effects are not caused by local absorption, but by the patient swallowing a mixture of blood and cocaine after a large polypus has been removed. Quite frequently two drachms of a 10 per cent. solution of cocaine are sprayed into the nose without the operator being aware of it. The safest and most satisfactory way of producing local anæsthesia in these cases is by the use of numerous small pledgets of absorbent wool soaked in a 10 per cent. cocaine solution; in this way the cocaine

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may be applied to the most sensitive parts, and there is but little danger of the patient swallowing any.

The nasal snares in common use are very numerous, and perhaps the easiest to manipulate is Hovell's modification of Mackenzie's snare; other good snares are Lack's and Blake's. When polypi can be seen arising from the mucous membrane covering the middle turbinate, removal of the anterior half of that bone is indicated, for it is now recognised that polypi will recur as long as the middle turbinate is left intact, the reason being that the bone itself is diseased, for sections show that a definite osteitis is present. This operation of removal of a portion of the middle turbinate bone may be quite easy or extremely difficult; if the anterior end of the bone is enlarged, and the nasal fossa fairly roomy, there is not much trouble, but in a narrow and very sensitive nose it may be a very tedious proceeding.

All the instruments necessary for the removal of the anterior end of the middle turbinate bone are a pair of Walsham's scissors, and a nasal snare fitted with strong wire. If the patient's nose is thoroughly cocainised, the operation should be almost painless. The patient's head should be firmly held by an assistant, and one or two bold cuts made with the scissors, as near to the outer attachment of the bone as possible; in performing this part of the operation considerable pressure must be exerted to prevent the scissors from cutting "short," *i. e.* slipping away from the bone.

The snare should be quickly adjusted before blood obscures the parts; further manipulation depends entirely on the operator's experience and skill.

I have found the following procedure easy and successful:—The wire loop should be bent so as to form an angle of about 120° with the barrel of the snare; after the bone has been divided with scissors, quickly pass the loop over the anterior end of the middle turbinate, and pass the end of the barrel along the line of the incision, using a fair amount of pressure; then draw the wire in tightly. The chief difficulty in the operation is to prevent the wire from slipping over the anterior end of the bone, and so only snaring the mucous membrane. This can be avoided by making a free incision, and forcing the end of the snare well along between the cut surfaces of the bone.

The only other intra-nasal treatment which it is necessary to draw attention to is the method of dealing with a suppurative ethmoiditis, which is so frequently associated with antral and frontal sinus suppuration.

The ethmoidal cells may be treated by repeated operations under cocaine, or by one free curettement under gas or chloroform anæsthesia. In all those cases which are associated with suppuration in any of the other accessory sinuses the operation under general anæsthesia should be chosen, and is best carried out in the manner described by Dr. Lack; he uses a Meyer's ring curette, working from behind forwards, and exerting a firm pressure outwards. All polypi, diseased and softened bone, and all cell-partitions are removed, and the cells thrown into one cavity; when there is much disease present the orbital plate may be bared, or even perforated, with no worse result than œdema and swelling of the lids, with some effusion of blood. These cases in Dr. Lack's hands do astonishingly well, and no cases with serious complications have yet been recorded; nor should there be any special fear that such will occur when it is recollected that the nasal veins and lymphatics—in the adult—have no communication with those of the cranial cavity. The only risk is that in an unskilled operator's hands the cribriform plate might be injured; but, as has been pointed out, the roof of the nasal fossa is very narrow, and it is doubtful, even in the absence of the superior turbinal bone, whether the plate could be injured accidentally with such an instrument as Meyer's large curette. Hæmorrhage is smart at the time of operation, but soon ceases with the rapid formation of a clot. Cases do as well without packing as with, and are much more comfortable.

Dr. Lack's operation should not be lightly undertaken in patients over fifty years of age, and old age or severe organic disease are distinct contra-indications. I do not think this operation is necessary in other than fairly advanced cases of ethmoidal disease. In those cases where polypi, arising from the mucous membrane of an *apparently* healthy middle turbinate, recur, I advise the removal of the middle turbinate with scissors and snare, followed, if necessary, by curettement of the ethmoidal cells later.

After such intra-nasal treatment as has been described, and after the antral disease has been

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given a good chance of cure by the method of alveolar drainage, but without a favourable result, a radical operation is indicated, and all the parts are in good order for the major operation to be performed.

There is no great difficulty in this operation, but it is necessary to refer to a few practical points. Chloroform should be the anæsthetic administered. If the head is not kept in a dependent position it will be of great assistance, both to the anæsthetist and operator, to plug the post-nasal space with a sponge firmly attached to a long piece of tape; a sponge should also be placed in the cheek of the side which is going to be operated upon.

An assistant should draw the upper lip and angle of the mouth upwards and outwards, so as to expose the mucous membrane over the anterior wall of the antrum. Make an incision down to the bone, taking care not to make it too far forwards, otherwise the opening into the antrum will be made close to its inner wall, and so render further manipulations difficult. The opening into the antrum may be accomplished in a number of ways, but I think none is better than with the chisel and maller. Burrs are much used, but I have noticed that they produce much bruising, more subsequent swelling of the parts, and greater after-pain than is the case when the chisel and mallet are used.

The opening should be sufficiently large to freely admit the forefinger. Examine the state of the mucous membrane, and if polypoid curette away the soft parts. It is not common to find the antrum *full* of polypi, though small polypi and granulation tissue are often found. I think the tendency, if anything, is to curette the parts too freely, and remove mucous membrane which would subsequently be useful. Roughened areas of bone and loose necrotic pieces of bone should also be searched for, but are not frequently found except in old-standing and severe cases; if a patch is found, I think it is of assistance in giving a prognosis, for when present a speedy cure must not be expected.

The next and most important step in the operation is usually the most difficult, *i. e.* the removal of as much of the inner wall of the antrum—below the level of the inferior turbinate—as possible, and on the success of this procedure largely depends the result of the operation. The aim in view should be to make an opening into the inferior fossa so large that it remains as a permanent opening through which the antrum can effectually drain.

The thin portion of the inner wall immediately below the inferior turbinate can be broken down either from the nose or antrum with a small burr; the lower and denser portion of the inner wall must be removed in the best way possible with a chisel or gouge; this is a difficult proceeding.

There are various methods of after-treatment. Some surgeons pack the antrum with long strips of gauze from the nose, and allow the opening through the canine fossa to close. This closure takes place readily, and in my experience the trouble is to keep this opening patent if it has been decided to drain through the canine fossa; drainage through the anterior wall is not satisfactory.

Others, again, use no packing at all. The opening in the anterior wall is allowed to close, and irrigation of the antrum is carried on through the free opening in the inferior fossa; this is the best form of treatment, and certainly the most comfortable for the patient. Unless the patient is aged or suffering from shock he can get up on the second day, and at the end of a week he may be taught how to keep his own antrum clean; this is best accomplished by warm boracic or alkaline lotion. There seems to be no advantage in strong antiseptic lotions, and this is no doubt due to the fact that what discharge continues is caused by a hidden patch of carious or necrotic bone within the antrum.

If the purulent discharge is almost as profuse after this operation as it was before, and if the ethmoidal cells be thoroughly treated, it is quite certain that the frontal sinus is also affected, and treatment should be directed towards it. Before opening the frontal sinus from without it is well to give the patient a course of intra-nasal treatment, for the radical operation, as will be seen later, is not without risk. If the patient is suffering no pain or discomfort beyond that caused by the annoyance of a nasal discharge, and is able to follow his occupation satisfactorily, it is questionable whether the operation should be strongly advised; at the same time a cure must not be expected from irrigation, and it is difficult to say how these cases terminate if allowed to drift.

Pain and profuse discharge are the indications for the major operation.

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If it is decided to open the sinus, the skin over the frontal sinus region should be thoroughly cleansed a day previous to operation, and covered with a wet boracic pad. Chloroform anæsthesia is the most convenient. The first care should be to firmly plug the post-nasal space with a sponge; otherwise great trouble may ensue when the opening into the nose is made through blood passing into the trachea. I know of two cases where an urgent tracheotomy had to be resorted to as a result of not taking this precaution.

The best incision is that passing over the lower part of the sinus, commencing externally below the inner third or half of the eyebrow, and extending on the side of the nose almost as far as the level of the inner canthus. The advantage of this incision is that the resulting scar is scarcely noticeable, and that its lower portion over the upper part of the infundibulum is of a great assistance when a free opening is made into the nose.

In the first incision the supra-orbital nerve is divided, and in reflecting the periosteum the trochlea for the tendon of the superior oblique muscle is often pushed backwards. The opening into the sinus should be made with a chisel and mallet, and gradually enlarged as is found necessary; the mucous membrane lining the cavity is exposed, and could scarcely be mistaken for dura mater, as it is different in colour and texture; more often the mucous membrane is divided at the same time as the bone, and pus is seen at once if the hæmorrhage has been effectively controlled. The size and shape of the sinus should next be examined with a probe, and note taken whether there is any communication with the sinus of the opposite side; if the sinus is quite small, a good prognosis may be given, because there will be no trouble in obtaining a complete cure by *obliteration* of the cavity; to do this, the anterior bony wall should be removed piece by piece with the chisel, and the soft parts allowed to fall into the cavity. If the sinus is large, or of moderate size, as is more usually the case, a complete cure is much less likely. As a rule, numerous small pouches are present along the periphery of the sinus; the lining of these *culs-de-sac*, as well as that of the sinus, should be curetted, but not too freely.

The next and most important step in the operation is to make a free opening into the nose; if the previous intra-nasal treatment has been thorough, and upon the lines indicated above, there is not much trouble; it is most easily accomplished with a small curette or burr upon a curved handle; in using the instrument, the concavity is directed forwards, and if any curetting is done, it should be of the anterior ethmoidal cells only.

There are many methods of draining the sinus, but whichever is selected, the first incision should not be closed, as was the custom at one time; an ordinary stout piece of drainage-tube or several pieces of malleable wire bent upon each other serve very well as efficient drains; some surgeons use a curved metal tube; the advantage of the metal drains is that they can be removed and cleaned much more readily than rubber tubing.

It is a debatable point whether complete obliteration of the sinus should not be aimed at in all cases; of course cure can be more confidently expected, but the amount of resulting deformity, when a large sinus is obliterated, is so great, that the operation could not be justifiably recommended where personal appearance is much valued.

There is no doubt as to the benefit of the operation, even when the sinus is not obliterated; but it is well to remember that the possible complications of the operations are of a serious nature. This is scarcely the place to deal with these in detail, but a brief outline of the class of case may be of interest. I have seen three cases end fatally; in two of these as the result of an operation, but the third could in no way be ascribed to operative interference.

They may be conveniently classified into acute and chronic; in the former the symptoms set in shortly after operative interference, and take the form of an acute septic basal meningitis.

In the chronic cases the patient is apparently making a good recovery from the operation when he begins to suffer from frontal headache, and a puffy, slightly œdematous swelling appears over the frontal bone; if the swelling is incised, a large area of the outer table of the frontal bone is found to be carious, though no definite line of demarcation may be found at this stage; striking features about these cases are the enormous thickening of the periosteum, and the relatively small amount of pus formed.

Necrosis of the skull bones follows, and nothing seems to stop the process; death takes place from exhaustion of brain abscess. One of the above cases terminated with infection of the mastoid antrum and lateral sinus, and formation of a cerebellar abscess.

The question is: Can these complications be avoided? It must not be forgotten that this is a possible termination of untreated cases, and that at the time of operation the process may be well established, though producing no alarming symptoms; certainly in one case the large area of unsuspected necrosis found at operation must have started long before the patient—who was only in hospital one week—came into hospital.

The chief indication is to keep the primary incision open, and allow free and continued drainage into the nose by wearing some form of drain for two or three months.

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THREE CLINICAL LECTURES

ON

THE DIFFERENTIAL DIAGNOSIS AND PROGNOSIS OF THE COMMON INFECTIOUS DISEASES.

Delivered at the Medical Graduates' College and Polyclinic, February 4th, 1901,

By F. FOORD CAIGER, M.D., F.R.C.P.,

Medical Superintendent South-Western Fever Hospital, Stockwell.

LECTURE I.

GENTLEMEN,—In order to deal in as systematic a way as possible with the subject of these lectures, I think it will be better if I begin with the question of diagnosis. This can be best approached from the standpoint of certain symptoms which are common to several diseases, because, though it must be admitted they represent a source of confusion, at the same time they form a bond of similarity between the various members of the group. I take it there are very few present who have been fortunate enough to have escaped finding themselves at one time or another in the invidious position of being uncertain as to the diagnosis of a particular case, and I can claim to have had an unfortunately wide experience in that respect, having been closely concerned for the last fourteen years in the diagnosis of these various fevers. You can quite understand, therefore, that one has felt one's self in an awkward position on many occasions.

I think that the difficulties which we encounter in the diagnosis of infectious diseases are mainly attributable to the following reasons. In the first place there is the fact that the same symptom is common to various affections; it may be a rash, a sore throat, a swollen gland, or perhaps diarrhœa; and then again, there is the fact that in many instances the disease is present in an extremely mild form, the symptoms, perhaps, being so ill-defined that it is a matter of uncertainty as to whether or not there is sufficient evidence on

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which to form a diagnosis. In respect to these negative attacks, infants and adults who have had a previous attack are undoubtedly the worst offenders. Babies we can forgive on account of their youth and inexperience, but one feels that one has a right to expect to receive more help from an adult. Then there is the fact that occasionally the most important and characteristic symptoms of the disease are so modified as to be almost beyond recognition; or they may be absent altogether, *e. g.* very often in measles the rash is wanting; in scarlet fever there may be no sore throat or swelling of the glands, and even no pyrexia. The fact that scarlet fever exists not infrequently without any pyrexia at all is not, perhaps, so well recognised as its frequency would warrant. Then, again, there is the fact that often more than one disease is present at the same time, and if this fact of co-existence be overlooked, the evidence obtainable is most conflicting. Until quite recent years there has been a very general impression in the profession that the presence of one disease excludes another; but so far from this being the case, I think one is justified in saying that the presence of one disease rather favours the development of another, if the patient be exposed to infection. On looking up the statistics of the Metropolitan Asylums Board hospitals during the last three years, we find that between 70,000 and 80,000 cases were admitted. Of these cases, in just under 3 per cent. two diseases were present on admission; and the number of cases in which a second disease developed very soon after admission is very much larger. These, I think, represent the most important difficulties which interfere with a straightforward diagnosis. As minor sources of difficulty, one may mention the fact that the practitioner is often not called to an attack until the distinctive symptoms are past; or he may be unable to see anything at all in the homes of the poor, where there is often no light, and the patient's skin may be extremely dirty. Then there is also the fact that we are often handicapped in our diagnosis by some preconceived notion. This is particularly liable to be the case should the attack be supposed to be connected with some previous case of illness.

In view of the possession of some symptoms in common, the infectious diseases tend to range themselves in certain groups when we attempt to classify them according to their clinical features; and therefore, for the purpose of differentiation, it will be convenient to retain these groups, and to include in them certain other non-specific affections which are most often mistaken for them. We may, first of all, consider a group in which the point of resemblance is the presence of a diffuse erythematous rash, *e. g. scarlet fever, measles, rötheln* (*German measles*), and to these we should add *smallpox* in an early stage, and lastly, the *febrile rash which so frequently follows the injection of antitoxic serum.*

Now I think that measles and scarlet fever may be taken as types of the group, and it will be worth while to spend some time over a detailed consideration of their individual symptoms; although, perhaps, owing to the fact that I am addressing a post-graduate audience, such proceeding on my part may seem unnecessary. With your permission I propose to run through in some detail the symptoms of these two affections, in order that we may be in a better position to recognise the distinctions between them, and other diseases with which they are often confounded. In *scarlet fever* we have an incubation of slightly less than three days; it is sometimes forty-eight hours, or even slightly less, and it may extend to five days, and in one or two reported instances even to six days; but the statement which you often meet with in the text-books, that the incubation may extend to ten days, is quite unjustified. The symptoms of invasion are fairly pronounced; we have in a large proportion of cases sore throat and vomiting, in a lesser number headache. Of course in children it may be difficult to get evidence of headache, because they are not in a very good position to explain their feelings, but in adults there is usually a complaint of headache. Vomiting is particularly constant in children, the statistics showing that in something like 80 to 85 per cent. of cases of scarlet fever the attack is ushered in with vomiting. The rash appears as a rule within twenty-four hours of the first sign of illness, and the rash has special characters. It is, as the name implies, usually of a scarlet colour. I think, perhaps, it is best described as of a bright brick-red, verging in some cases towards pink, and in others towards purple; but it does not follow because the rash is of a purplish colour that the attack will be a very bad one. There is

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a good deal of misapprehension on that point. The eruption first appears on the chest and neck, and then spreads rapidly over the body. It is, as a rule, at its height on the third or fourth day, after which it fades, and is gone by the end of the week.

But on certain parts of the body, namely, the outer side of the arms and legs, where the skin is normally rough, a coarse papulation often remains for three or four days longer, and should one not be called to a case until a week after the appearance of the first symptoms, the presence of these coarse papules on the arms and legs may afford valuable evidence of the antecedent eruption. Anatomically the rash consists of two factors, a bright erythematous flush, and a fine papulation, which is often spoken of as "punctation;" in fact, the actual papulation may not be very apparent. During the later stage of the eruption, as a rule, the erythema has faded, and the punctation or papulation alone remains, so that if you attend the case for some time it may be difficult to realise that there has been an antecedent erythema. There are certain portions of the surface on which the eruption does not conform to these characters, viz. the face, the palms, and the soles. On the face the eruption, instead of being of a puncto-erythematous character, is simply a flush, and this flush is particularly intense on the cheek; and it may be seen, though less intense, on the forehead, chin, and elsewhere. The portion of the skin surrounding the mouth is invariably uninvaded, so much so that one is justified in speaking of the circumoral pallor. The line of demarcation between it and the vividly flushed cheek is well defined, being bounded by the naso-labial folds. I do not mean to imply that this limitation of flush to the cheek is distinctive of scarlet fever, because it is an appearance often seen in other diseases, especially inflammatory ones, such as pneumonia. But this is where the scarlatinal character comes in,—the surface of the vividly flushed cheek usually becomes covered with a fine powder, which may be seen as early as the second or third day of the eruption, and this powdering is evidence of very early desquamation. The patient seems to have a sort of powder and rash appearance on the cheek, as if he had been made up for the stage. In young children it is a particularly becoming complexion, and is, in fact, a good deal more so than the artificial product which one so often sees about. In this case I think we may fairly say that Nature triumphs over Art. The appearance is most distinctive of scarlet fever during the second to the fifth or sixth day of the rash. On the palms and soles the rash, instead of being macular, as it often is in measles, in scarlet fever is simply represented by a flush, and no signs of spotting or punctation are to be seen.

The temperature is a fairly characteristic one, its usual duration being about five days to a week. It has a markedly pyramidal shape on the chart, and the most noteworthy fact is that the uprise of temperature is more steep, as a rule, than its defervescence. The climax is usually reached on the third or fourth night, and the thing to note most particularly is that the improvement occurs by lysis, and not, as is so often said in the text-books, by crisis. There is no such thing as a temperature crisis in scarlet fever, as it falls gradually in the way I have indicated. The pulse in most cases of scarlet fever during the first twenty-four to thirty-six hours is unduly rapid, and that may be regarded as the essential characteristic of the scarlatinal pulse. After the first twenty-four to thirty-six hours the normal relation between the pulse-rate and temperature is maintained.

The fauces in scarlet fever are injected and reddened, but it by no means follows that there will be much swelling of the tonsils, and, I think, on this particular point there is often a good deal of misconception. The strictly scarlatinal feature in the throat is a vivid red injection of the mucous surface; and whether or not there is much swelling of the tonsils appears to be more or less of an incident, as in the most typical cases of simple scarlet fever there may be but little inflammatory swelling of the tonsils. Again, in the worst cases of the septic variety there may be enormous swelling of the tonsils, with much ulceration, and in some severe attacks an exudation may be present on their surface, which I shall refer to later. The next symptom of really great importance is the scarlatinal tongue. The "strawberry tongue" in scarlet fever is almost a household word. Usually by the end of the second day the sides of the tip of the tongue will be noticed to be unduly red, and somewhat raw looking; and by the end of the third or fourth day the tongue is often completely stripped of its epithelium, and looks like a ripe red

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strawberry. The strawberry appearance is usually maintained until the beginning of the second week, when the normal appearance again returns, and this particular character is lost. Now the swelling of the glands in connection with the throat is usually proportionate to the intensity of the faucial inflammation. It will vary in different cases from a simple fulness, which is just palpable to the touch, up to an amount of inflammatory infiltration of the glandular and connective tissue lying between the lower jaw and the clavicle, sufficient to entirely fill up this space with a tender brawny induration. Dr. Collie, of Homerton, many years ago spoke of this condition, which is so distinctive of severe septic scarlet fever, as "bull-neck," and it really is a very good term.

The next point to mention is the desquamation. The first evidence of desquamation I have already referred to, viz. the fine powdering on the already flushed cheek in the early stage; but during the course of the next few days the peeling spreads, and by the end of the first week it may usually be discerned on the face, neck, and upper part of the chest; by the end of the second week in most cases evidence of peeling is to be found all over the body. It may be that on the hands and on the feet, especially on the palms and soles, the skin has not yet begun to peel, but you will find evidence that it is shortly going to do so, since it will be noticed that the cuticle is becoming dry and atrophic. It has a feel like that of parchment, in consequence of its nutrition being impaired. By the end of the fourth week the whole of the peeling may be complete, excepting on the palms and the soles, which may take from two to four weeks longer. So much for the average progress of the peeling. The character of the peeling will vary according to the situation, and to the peculiarity of the individual patient's skin. On the face it is likely to be of a powdery character; on the chest, trunk, and anterior surface of the extremities, where the skin is normally soft, it is more likely to be of a fine scaly order; and where the skin is normally thick, as on the palms and soles, it may be shed in large thick flakes. The particular character of scarlatinal desquamation, which serves to distinguish it from other forms of peeling is this; usually there are to be noted a number of small pin-holes in the superficial layer, which gives to it a worm-eaten appearance. These pin-holes are a very distinctive feature when detected, but, judging by the fact that they are rarely described in text-books, I take it that their importance cannot be sufficiently recognised. If, then, we look at the surface of a portion of the skin, say the abdomen, at an early stage, we notice numbers of these holes, from which peeling is beginning to extend centrifugally. The rings and holes are, of course, simply in the superficial layer of the cuticle. As the peeling progresses the movements of the body and the friction against the bed-clothes cause them to become larger and larger until their peripheries gradually become merged, so that the whole of the cuticle of that particular portion is shed, except those portions where the different systems, as it were, join. Therefore, though the early stage of scarlatinal peeling is characterised by this pin-hole or worm eaten appearance, a later stage is characterised by a number of irregular, often triangular, islets of skin, which yet remain to be detached. By careful attention to these particular characters scarlet fever peeling can be usually distinguished from other forms, which are likely to confuse the diagnosis.

The other points which call for mention in connection with scarlet fever are certain complications which are liable to arise during convalescence. They are—otorrhœa, due to otitis media: albuminuria, occasionally attended with definite evidence of nephritis; cervical adenitis, in other words inflammation of the glands of the neck, springing up during convalescence; and lastly, rheumatism. These four affections are distinctly related to the scarlatinal process.

One may mention incidentally that the otorrhœa is almost entirely confined to children, and in examining the records of a large number of cases under ten years of age I have found it present in 15 to 18 per cent., so that it is a very common complication. Adenitis will be present in something like 9 to 11 per cent., albuminuria (including acute nephritis) about 8 to 10 per cent., and rheumatism in about 4 to 5 per cent. This latter complication, it appears to me, deserves a few words of special mention. It is of the very greatest assistance to diagnosis, because the rheumatism comes on at what we may call a stated time, viz. just when the rash is disappearing and the temperature coming down to normal. Then

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it is that a patient is likely to complain of rheumatic pains in the finger, or metacarpal joints, or the wrists; and this is so in a large number of cases in which scarlet fever attacks an adult. In children you do not often get it, but the percentage of cases of scarlet fever in adults who have rheumatism at this particular time is about 13 or 14 per cent.; so you see it comes in as a valuable confirmatory sign in those cases of scarlet fever in which the diagnosis may have been uncertain.

As regards *measles*, the incubation is fairly constant. It lasts about ten days, but it may be three days less, or two or three days longer. The symptoms of measles are practically those of febrile catarrh. There is usually lachrymation, intolerance of the light, and perhaps actual injection of the conjunctivæ. There may be running from the nose, sneezing, frontal headache, and perhaps bronchial catarrh. Those are the common invasion signs. The eruption comes out in most cases during the third night or fourth morning. The eruption is of a spotty character, as opposed to a diffuse erythematous flush. The spots are usually first recognised at the sides of the neck, behind the ears, and on the forehead. During the course of the next day or two these spots have become larger and more raised, and tend to run together, forming irregular tracks of injected skin, at which stage the measles eruption is at its height, and is therefore characteristic. The eruption, as a rule, fades from about this time onwards, so that in the course of about two or three days more it has entirely disappeared, except that a mottled staining of the skin remains for several days longer. A point to emphasise in connection with the measles eruption, is that it commonly invades the circumoral region, which as I have just mentioned, in scarlet fever always remains pale and unaffected; on the palms and soles it is more often of a spotted character than a simple flush. Instead of definite faucial inflammation, we get, it is true, an inflammatory condition of the mucous lining of the mouth, but it is part of a generalised catarrh. This catarrh of the buccal mucous membrane is apt to present certain appearances which, especially on the Continent, have received special attention. I think it was Filatow who first described certain small white spots, as being visible on the mucous surface of the cheek and gums, in the region of the molar teeth. Koplik, of New York, afterwards investigated the subject, and published a series of cases, and several others have done so since. These "Koplik's spots," as they are usually called, may sometimes be discerned one, two, or even, it is said, three days before the eruption is apparent, and they are described as being of a bluish-white colour and situated on a slightly reddened base. They are never seen on the palate, though sometimes present on the gums. One can quite understand that if this be a fact, these spots should be of the greatest value in the early diagnosis of measles; and that it is a fact I do not think can be gainsaid. On referring to the statistics quoted by Falkener, in the 'Metropolitan Asylums Board Report,' 1899, I find that amongst 291 attacks reported by seven different observers, in 274 the "Koplik's spots" were found in the pre-emptive stage of the disease. On the strength of their presence it has become quite a common practice to isolate a case, on the supposition that measles is developing, and I can only say that in the opinion of these observers it is a sign of the very greatest value. I am sorry to say with regard to my own experience, that I am not able to confirm so fully its value. I do not know whether it is that my sight is defective, or whether the light in this country is not so good as it might be (because all observers insist on the necessity of a good light), but I have certainly not succeeded in seeing them so often as appears to be the case on the Continent, where the sign has been so frequently reported.

The temperature in measles has a very characteristic course, rising usually with the first symptoms of catarrh. During the course of the next two days, as a rule, it declines somewhat; but as the rash appears, perhaps during the third night or fourth morning, it suddenly increases, and reaches a climax in twenty-four to thirty-six hours. Then there is a rapid fall, and the patient is practically convalescent.

The temperature crisis occurs within thirty-six hours of the eruption having definitely come out. Should the temperature not fall in that way, you may be pretty sure that some complication has supervened, probably bronchitis or broncho-pneumonia.

As regards the peeling of measles, most cases with a good eruption show some peeling, but it is usually ill-defined, and by no means extensive. It is branny or scurfy in character, and is all over

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at the end of a fortnight. Peeling is not common on the face or on the extremities, and never occurs on the palms or soles.

I will just reiterate the points by which these two diseases are to be contrasted. It is perfectly true that in most cases the diagnosis should not present much difficulty; but, as a matter of fact, the number of cases sent up to the fever hospitals, in which the diseases are confused is considerable, and so I think there is sufficient justification for devoting a few moments to it. First of all, the incubation in measles is about ten days (it may be fourteen) and in scarlet fever about three or four. The symptoms of invasion in measles comprise catarrh, and the frequent appearance on the mucous surface of the cheek or gums of "Koplik's spot;" whereas in scarlet fever you have distinct faucial inflammation, usually attended with vomiting. The rash comes out in measles as late as the fourth day, and in scarlet fever usually on the second day at the latest. It is of a distinctly spotty character in measles, with a tendency to later aggregation, whereas in scarlet fever it is a diffuse erythematous rash without any portion of skin remaining uninjected; but in measles the skin between the different spots or aggregation of spots is unaffected, and this is most distinctive. Then there is the fact that the temperature in measles often shows an improvement for a day or two, and then, rising rapidly with the eruption, reaches a crisis at the end of some twenty-four to thirty-six hours; whereas in scarlet fever the temperature gradually mounts to a climax about the third or fourth day, and then more gradually falls to normal. The rash in measles is of a spotty character on the face, whereas in scarlet fever no punctation occurs on the face, and the circumoral region is uninvaded. On the palms and soles in measles there is usually a spotted eruption, and in scarlet fever they are simply flushed. And lastly, the peeling in measles is quite atypical and scanty; whereas in scarlet fever it is distinctive and prone to be excessive. Finally, there is the fact that the complications or sequelæ of measles commonly represent an extension of the original catarrh, it may be of the conjunctivæ or bronchial mucous membrane, and not infrequently broncho-pneumonia, whereas in scarlet fever there are several distinct affections, pre-eminently, albuminuria, adenitis, and rheumatism.

Now there is a third disease, namely, *rötheln*, which is very frequently confused both with scarlet fever and with measles. It resembles scarlet fever in that it is accompanied by slight sore throat, and that there is an absence of any pre-eruptive period; also in the fact that the rash during its later stage is somewhat scarlatinal in character, and that there is usually some reddening of the fauces. It resembles measles in having a long incubation, in the fact that the eruption is of a spotty character from the outset, and that there is usually slight evidence of catarrh. The appearances in rötheln would be these:—The patient may possibly complain of slight malaise for some hours or a day before the eruption appears, but in most cases the eruption is the first sign. It consists of a number of discrete small pinkish spots appearing on the trunk, but in some cases first on the face. These tend, in the course of the next twenty-four or thirty-six hours, to become confluent, and the rash then takes on a diffuse erythematous character, such as you see in scarlet fever. This diffusion of the rash occurs most frequently on the limbs. The temperature in perhaps the majority of the cases shows a slight rise, it may be 100° to 101°, but not very often more; it becomes normal usually within twenty-four to forty eight hours, but in a very large number of cases there is no pyrexia at all. The fauces are red and slightly tumid, but as a rule not sufficient to give rise to any pain or discomfort in swallowing. There is a complete absence of those particular spots described by Koplik; and lastly, one should mention a symptom which is supposed to be distinctive of rötheln, and that is an enlargement, accompanied by tenderness, of the posterior cervical lymphatic glands, especially the chain of glands running down the posterior border of the sterno-mastoid. Unfortunately in most cases both of scarlatina and measles in which there is an exanthem slight enlargement of these glands is apparent, and so the distinction is almost valueless; but should the enlargement be pronounced and attended with distinct tenderness, so much so, that the patient complains of it, it is strong confirmatory evidence of German measles. I have never seen a case of scarlet fever or of measles with such enlargement in which the tenderness was sufficiently pronounced as to lead the patient to himself complain of it. Not infrequently, however, in rötheln the patient,

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if an adult, will call attention to the fact that he is stiff in the neck, and very tender there. On feeling, you will find considerable fulness of these glands, some of which may lie quite by themselves, and their outline may be clearly defined. I think the points I have mentioned will be sufficient for the diagnosis of most cases of rötheln, but there has been a great deal of uncertainty about it in the past, and it is only comparatively recently that we have been in a position to say that rötheln is really a distinct disease.

The confusion has been mainly attributable to the fact that evidently two diseases have been described as rötheln at different times; for instance, the disease described by Patterson, in 1840, and the earlier German writers, was apparently measles, nothing more or less; whereas the disease as described by Thomas in 'Ziemssen's Handbook' is in accord with the appearances of the mild disorder which we recognise as rötheln at the present day.

It must be admitted that in isolated attacks the differentiation between measles and rötheln is sometimes very difficult. In rötheln, however, the eruption usually shows the following differences, the differences being of degree rather than of kind. The rötheln spots are, as a rule, smaller, more discrete, and pinker; they are more likely to spare the face, more transient, and give rise to less staining; but, on the other hand, they are followed by rather more peeling. I am afraid it is difficult to expect any one who has not given special attention to the subject to remember all these points of distinction, but at the same time I can assure you that they are of great value.

Well, gentlemen, the next point to consider is *smallpox*, in view of the chance of its being mistaken for either measles, or scarlet fever, or rötheln. It is only during the early stage that any difficulty is likely to arise, but a certain number of cases of smallpox are attended with an initial eruption which is very like the scarlatinal rash, but, as a rule, the eruption is of but limited extent. It is most common on the lower part of the abdomen and the upper part of the thighs, and also on the sides of the chest, often of triangular shape, with the apex in the axilla. The actual eruption itself is anatomically similar to that of scarlet fever; you get punctation and a diffuse flush, but, as I say, it is usually limited to these situations. The true smallpox eruption which subsequently develops will in many cases avoid this particular site; but, on the other hand, the eruption may tend to be more copious on the site of the prodromal rash, and in some cases even hæmorrhagic. Further points in the differentiation of smallpox from scarlet fever would be the absence of sore throat, and the occurrence of a rigor and severe pain in the back.

Smallpox is occasionally mistaken for measles, though it is only in the early eruptive stage that this mistake is likely to occur. The eruption of smallpox at an early stage may be said to be macular, as it is in measles, but by passing the hand over the surface you can feel that there is definite induration corresponding with the points where the spots are seen. I remember on one occasion mistaking an early case of smallpox for measles in a child who had been recently admitted to a convalescent hospital, with the unfortunate result that it became necessary to vaccinate some two hundred cases; and I can only say in self-defence that this child had not shown the lumbar pain usually so distinctive of early smallpox, and, moreover, the patient had been for some three weeks previously in a ward in which there had been no case of smallpox for three or four years, so there was some justification for the mistake. In that case the smallpox eruption during the first day was curiously like measles; but later on the obvious induration of the spots suggested the true nature of the attack, especially as there was a complete absence of the coryzal symptoms usually associated with measles.

As regards *antitoxin rashes*—in other words, rashes which are definitely dependent on the injection of antitoxic serum, in most cases they are either urticarial or morbilliform. They are constantly spoken of as urticarial in character, although actual statistics show they are more frequently morbilliform, and, indeed, they are extremely like measles; but by paying attention to the following points in most cases the distinction should be made. The antitoxin rash is more likely to be patchy in character than that of measles, and more likely to spare the face, the individual spots often being larger. It may be of an annular or gyrate form, and some cases of antitoxin rash are really extremely pretty, consisting of beautifully formed little rings all over the surface

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of the skin. The eruption is attended in many cases with intolerable itching. The itching may be so great as to cause even a person of calm temperament to lose his temper, and in some instances it is only fair to say that the patient is absolutely beside himself. The eruption, moreover, is apt to be attended with pyrexia of an irregular character, lasting about a week, and often attended with pains in the joints. Actual arthritis is not common, but in some cases there is distinct effusion. One other point is of great diagnostic value, and that is, that if the eruption at any point shows a tendency to an urticarial development, it is quite sufficient to negative a diagnosis of measles; indeed, on that one fact you can often make up your mind without any difficulty that it is simply an antitoxin rash.

Enuresis.—Four cases of enuresis are reported in children from seven to twelve years of age, in whom the usual remedies failed. Examination showed more or less ocular defect, producing eye-strain. Glasses were prescribed, and the correction made, with the result of relieving the symptoms. Frame has not found much literature on this cause of enuresis, though Gould reported several cases cured by correcting the refractive errors. During his twenty years' practice he has seen a number of resistant cases, which he is now inclined to think may have been similar to those reported. He believes a certain number depend entirely on ocular strain, and whenever medication fails we should refer the case to an oculist for examination.

Antitoxin.—Happel details four cases of diphtheria treated with antitoxin, with the intention of impressing on the profession the importance of using this remedy. He agrees with those who hold that there is no maximum dose of antitoxin. Generally speaking it should never be less than 1000 or 1500 units in any case, and not less than 3000 units in any case of laryngeal diphtheria of malignant type, or in those of a longer standing than twenty-four hours.—*Journ. Amer. Med. Assoc.*, March 2nd.

WITH DR. PHINEAS ABRAHAM AT THE BLACKFRIARS HOSPITAL FOR DISEASES OF THE SKIN.

(A Demonstration mainly of Cases of Eczema.)

1. THE first case I want to show you is a remarkable one. The patient came here about a year ago covered with large leathery patches on his back and chest, arms and thighs. In great part the skin affected was "hide-bound," and you could not move it from the tissues beneath. Some of the areas had loss of colour, they were whitish with some pigmentation around, and others were themselves pigmented. In fact, it was a case of generalised sclerodermia. I showed him at the Dermatological Society of Great Britain and Ireland, and that diagnosis was accepted without doubt. As a rule these cases are supposed not to improve rapidly, but you will see that these patches have nearly all disappeared from this man. He had at that time a certain amount of pruritis and itching, which we treated. This has recently returned, and it is for this itching that he is now attending. He came last week, and the note is "an old patient with extensive generalised sclerodermia. The patches are now nearly all gone." He was originally put upon thyroid-gland lozenges, and his pruritus was treated with antipruritic remedies, tar baths, etc. You can see some of the places where the sclerodermia was most marked. Sclerodermia is really a sclerosis of the skin, a hypertrophy and hyperplasia of the connective-tissue elements. There are localised cases which we call morphœa. Some of them give a history of some previous blow or shock, and I am inclined to think that the nervous system is locally implicated in many of them. The present case is a rare one, so I thought it would be interesting for you to see him, although the condition is so much improved that it would not be easy to make the diagnosis now. For the itching I have put him on large doses of quinine, and have given him tar baths and ointment. I have instructed him to have a bath every night, and rub the ointment well in afterwards.

2. The next patient is a man aged thirty-five. His hands and arms are affected with some nummular patches of exudation, and they are very

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itchy. I suspected it was a trade eczema. As a matter of fact he is a corn factor, and if he had any tendency to eczema this would bring it out. It is a rather common affection in bakers and people who have to do with flour, as well as in bricklayers and people who have to do with lime. He has had it ten months. Some of his nails are affected, *i. e.* the eczematous condition has affected them as well.

3. I asked this next patient to come in order to demonstrate the fact that it is quite possible to have two distinct skin affections at the same time. He came here last month with some punched-out ulcers, together with a very extensive inflamed exuding surface on the leg all around, only one leg being affected. It was undoubtedly a case of eczema rubrum; but in addition there were these punched-out ulcers, and here is a scar where he has had a serpiginous ulceration, now healed. He has had, indeed, a tertiary syphilitic ulceration as well as the eczema at the same time. It is important to remember the possibility of such a combination, because you must treat both conditions if you wish rapid improvement. You have to cure the eczema, and also treat the other affection with iodide of potassium, and with a special application to the ulcers themselves. As you can see, he has improved very much indeed. I ordered five grains of iodide of potassium with a little carbonate of soda three times a day, and gave him lotion and ointment for the eczema, and a special ointment the ung. rubrum of this hospital for the ulcers.

4. The next patient is an old man with an ailment in the leg. Three weeks before he came he had varicose veins and a severe inflammatory affection, only one leg being affected. The varicosity of his skin here has kept up a congestion in the small veins. These cases are especially liable to become eczematous, and to turn into eczema rubrum. Although he came here only a short time ago the condition is looking much less angry than it was. There was so much inflammation in this case that I added calamin to the tarry lotion.

5. I asked this young man to come to show himself. He had severe eczema of the fingers and hands. His business is a very irritating one, for he has to do with beer and such-like liquids, as he is a barman. This affection is not at all uncommon among barmen, but one can improve the condition. Indeed, if he can only keep his hands covered up, and away from all contact with the beer, he will get cured. We cure dozens of such cases in this hospital, but there is always a tendency to recurrence if the patients keep to their occupation. I always advise the wearing of gloves in their occupation, but many of them tell us they cannot do that. They can, however, constantly smear their hands with the curative "ung. petrolei co." of this hospital.

6. The next patient is a middle-aged woman with another form of eczema, namely, eczema of the papular variety. Such a condition may become vesicular, and even pustular. Her arm was very bad a short time ago, but now it is very much better. Her leg is still bad. You can see in many places small papules of a glistening character, very much like those one sees in lichen planus. This is a subsequent stage of eczema, "lichenisation" having taken place, with pigmentation and hypertrophy of the epithelial cells. I ask you to notice the scratch marks.

7. Here is a young woman who had scaly patches on the palms of the hands, symmetrical in distribution. There was no special margin, nor was there a serpiginous border, and the lesions were itchy. It is important to distinguish these cases from the specific psoriasis-like eruptions of syphilis, that is to say, the squamous syphilides. Squamous syphilides of the palm are generally in the tertiary stage of the disease, and are not symmetrical, only one hand being, as a rule, affected. But they usually have a raised serpiginous outline, healing with a superficial scarring in the centre. I asked another patient to come up, so that you might compare that asymmetrical squamous syphilide with this case of simple eczema of the palms.

8. Here is another woman, also with eczema of the palms of the hands. It is a typical case, and you see that there is no definite line of demarcation, the diseased part passing almost imperceptibly into the surrounding healthy skin.

9. This woman presents an old-standing case of eczema. She has always had a dry zerodermic condition of the skin, and eczema is frequently seen in such subjects, the abnormal dryness and want of elasticity causing less resistance to external irritants or injury and easily becoming eczematous; you can observe the fish-skin appearance of the

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legs. When the affection is more developed we call it "ichthyosis." It is nearly always congenital.

10. Here is a middle-aged woman, a typical case of erythema of only a week's duration. When she came to the hospital a few days ago she had raised ringed patches on the backs of her hands, some of them being characteristic "erythema iris lesions," the remains of which you can now see—a central raised spot within the ringed area. The swelling and erythema have mostly gone down, and the redness disappears almost entirely on the application of pressure. She complained of a burning feeling, but not itching. There is no tendency in this case to the formation of vesicles or papules, but there often is. She had some indigestion, and had been out of sorts, so I gave her some bitter aperient mixture, and mercury and lead ointment, and a lotion containing calamin. She has been doing very well on that treatment. In all cases of erythema you must look to the digestive system.

11. The next patient is a girl with a rash all over the body. She has had it a fortnight, and says it began on the chest. It itches very much. She has had sores in the head and impetigo. It looks rather like an exaggerated case of pityriasis rosea, a condition which generally attacks the chest in the form of rings. There is a tendency to desquamation here. She says it is getting worse. I shall now treat it as a seborrhœic dermatitis, which I think is the correct diagnosis.

12. This middle-aged woman is suffering from generalised lichen planus. The lesions are flat, reddish-brown papules, somewhat polished or glistening in appearance. You will see in the centre of each a greyish scale, which is thought diagnostic by Dr. Wickham and other French dermatologists. The individual papules are angular, very flat and they may become massed together. You can see here the little lines of skin separating the papules at the margin of the groups. The most common positions for this affection are the fronts of the arms and the shins; but it may occur anywhere, and eventually the condition may spread all over the body. Another common position for it is inside both knees, as you see in this case. She has it symmetrically, and it nearly always is symmetrical. One other diagnostic point about it is the extreme pruritus, and that is a most difficult thing to ameliorate. Various forms of tar give a certain amount of relief to that. The orthodox method of treating these cases is by pushing arsenic as much as possible. In Vienna they give "Asiatic pills." Here we give Fowler's solution, and this should be pushed as far as can be done. Some cases that I have had have resisted all treatment. I am now increasing this patient's dose to eight minims of Fowler's solution. I formerly tried thyroid gland in these cases, with success in some cases, but the treatment is very uncertain. As with psoriasis, I have on the whole more faith in the benefit of external remedies in lichen planus, than in the exhibition of arsenic.

13. Here is a little boy, and his case is such that I think very few people have seen anything like it; indeed, there have been but very few placed on record. It is a case of monilithrix, a congenital affection of the hairs—which are beaded. There are slides of it under the microscope. The first case of the kind was shown by Dr. Walter Smith, of Dublin, at the International Congress of 1881. Afterwards Drs. Calcott Fox and Payne, and other observers abroad, presented cases. This is the third instance that I have had under observation. In most of the other recorded cases there was a history of the same sort of thing in other members of the family, but in none of mine has that been the case. This boy came here with most of the hair follicles very much enlarged and inflamed, many of them being purulent. There is now a general improvement of that condition, but from my experience of other cases I do not think there will be any change in the monilithrix condition. He will get some normal hairs growing on his head as well as the beady ones, but he will have these hairs in his head when he is a man, and the hair generally will be very sparse and of course curious-looking. The hairs have been put into cultivating media, but nothing pathogenic has been found. An interesting point about the case, and one which I think is unique, is that the eyebrows and eyelashes are also affected, and you will see under the microscope a hair from one of these parts. The first case I had was in a girl who is now about fifteen years of age. The first time I saw her she was about four, she then had short hair, a trifle longer than this boy, but all having this beaded appearance. I put her under stimulating treatment for a long time. This certainly seemed

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to increase the growth of the normal hairs, but there was no improvement in the others.

14. This boy has almost complete alopecia areata, which he has had eight months. The mother lost her hair when she was seventeen, and it came back thirteen years ago. It is an ordinary case. He is rubbing in an ointment containing carbolic acid and salicylic acid, and in the daytime, also, a stimulating lotion containing ammonia, tincture of cantharides, turpentine, and camphor—a stimulating lotion which is also a parasiticide. An important part of the treatment consists in rubbing in, once a fortnight, Burt's liquor vesicatorius. There is probably no virtue in it particularly, but it has been used here for many years, and some of us think it is more efficacious than the liquor epispasticus of the 'British Pharmacopœia;' it is certainly less objectionable in smell. This has to be carefully applied, because if much is put on, too severe blistering is caused. I use it with a stiff brush with short bristles. This is dipped into the fluid and then squeezed almost dry. It should be applied first of all to the top of the head, and last of all down the back of the head, the neck being very tender indeed. I believe that if I can get some of this fluid pushed into the hair follicles, it desquamates the epithelium at the mouth and brings away the bacillus, and thus the cause of the alopecia is removed. Most of us now-a-days believe that the majority of cases of alopecia areata are due to a microbe, and Sabereau has practically proved that to be the case. On the eyebrow the liquid has to be applied still more carefully. In some of these cases there is a lack of feeling on the scalp at first. A certain number of cases of alopecia are no doubt due to some cause other than a bacillus. Statements of hair falling off in large quantity after frights and shocks used to be accepted in a certain number of cases. In the majority of cases, however, the trouble is doubtless due to the microbe, and in most of them there has been a history of seborrhœa for some time. According to Sabereau it is the same microbe which causes Una's seborrhœic eczema.

15. This man has had a skin infection six weeks. He has patches the size of a pin's head to that of a bean. The condition disappears on pressure. It is a curious case for diagnosis; that is to say, whether it is a case of lichens planus in the early stage, or an abnormal psoriasis. Its appearance is really that of a lichen planus, with dark red flat papules, glistening, and very itchy. There are a few papules on the front of the leg. I put him upon four minims of Fowler's solution, believing it to be lichen planus, and the usual external applications. I could not find any swollen glands, nor was there any evidence of syphilis. Of course one ignores histories in such cases if the symptoms are present, but there is nothing particular to point to syphilis in this instance.

Now I have taken the opportunity of showing you these cases, as I have always felt it is more interesting and valuable to a class of post-graduates to see cases demonstrated than to hear a formal lecture. To-day I tried to get together cases showing the various forms of eczema, and I have at any rate partially succeeded. You have seen two or three trade eczemas and eczema rubrum, as well as nummular eczema and papular eczema.

Eczema is a superficial inflammation of the skin, which commences as an œdema, leading to vesiculation and exudation, which may dry up and form scales. The inflammation may lead to the formation of papules scattered all about, or more commonly in patches, the confluent papules forming one mass. The French school, and the older authorities generally, believed that eczema was entirely a constitutional disease. But the moderns, smitten with the bacillary theory, tried to find a bacillus as a cause of all eczemas. Dr. Unna was the first to isolate a microbe or coccus which he thought was the cause of eczema, and by experimental inoculation of this microbe he has succeeded in producing an impetiginous condition. The probability is that the two views are correct, that eczema is partly constitutional, and, in some cases at any rate, due to micro-organisms. I dare say there are several micro-organisms in it as factors which have not been yet isolated. It is a most difficult subject, because if you take a platinum loop and touch the normal skin with it, and then inoculate with it a tube of nutrient jelly, you may obtain no end of different micro-organisms, and it is very difficult to say which of these become pathogenic at times in the normal skin. However clean the person may be kept there are thousands of bacilli in the skin. It is just possible that if something goes wrong with the

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soil the nature of the bacillus is somewhat altered, and inflammation is produced. That theory would explain the course of treatment, because we find that by a judicious combination of internal and external remedies we can often cure eczemas in a short time. I have a few coloured drawings of common eczemas. The older authorities gave them various names, according to the size of the patches, whether the papules are small or large, and whether they are scaly or weeping, and so on. But it does not matter very much. I think the chief divisions one can make will be into acute eczemas, chronic eczemas, and seborrhœic eczemas. Dr. Unna pointed out that in some eczemas the small scales produced were of a yellowish and somewhat greasy nature, and the probability is that inflammation of the sebaceous glands takes place in those seborrhœic cases, and that this gives rise to a more greasy exudation. Seborrhœic eczemas are often connected with seborrhœa of the scalp. His theory was that the scales from the head fall on to certain parts of the body, and start an inflammation there. You certainly find seborrhœic eczema more prone to appear on the extensor surfaces, the centre of the chest and centre of the back, just where the scales would fall. There is a tendency to the formation of rings in this seborrhœic eczema. The different forms of eczema are all described in the ordinary text-books. It will be more useful if I now point out a few other diseases which can be easily confounded with eczema.

Now there are some very serious skin affections which are sometimes mistaken for eczema. I show you a photograph of a man who had chronic eczema in patches for years. He had a somewhat scaly skin, and every now and then patches of eczema would come. When he came under observation here I examined him, and was struck by the fact that most of the patches were very chronic. Most of the cases of eczema one can improve very much by treatment. But in this man's case the patches indurated and inflamed very much, and treatment did not seem to have any effect upon him. I therefore came to the conclusion that it was a case of commencing mycosis fungoidis; indeed, the early lesions of that disease often appear to be like patches of eczema. Afterwards he developed the raised ulcers which you see. He went to University College Hospital afterwards, and died in a few months with enormous fungating tumours all over his body. It was a typical case of mycosis fungoidis. I had a similar case in an official of the school board, who was supposed to be suffering from eczema, and owing to the difficulty in effecting any improvement by treatment I was led to venture on the diagnosis that it was mycosis fungoidis long before the fungating tumours appeared. I lost sight of him for a year, and then I was asked to see him with regard to his having a pension, that is to say whether the condition was curable. I then found tumours all over his face and body, and he was in a frightful condition. I said he could not live very long, and as a matter of fact he is dying now.

Here is a drawing of a very bad case of pemphigus in a man who in the early stage was supposed to be the subject of eczema, and was treated for it. These forms of pemphigus in which the bullæ are not obvious, and in which they burst very quickly and leave large scales with a red weeping surface

Case of pemphigus.

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underneath, are very easily mistaken for eczema. This is a case which was so mistaken. He was admitted into the West London Hospital, and has recently died.

Anybody seeing the girl of whom I show you a photograph, would probably at first be inclined to think that it was a very bad case of eczema, but it was not; it was a case of generalised erythematous lupus, almost a unique example of that disease. It commenced with erythematous lupus of the face, and when she was admitted in the hospital some ten months ago she was very ill with œdema of the legs and feet, and a large amount of albumin in her urine. The erythematous lupus had appeared a few months before, and was at that time confined to the face and fingers. While she was in the hospital, the eruption gradually spread from the face, and practically became universal. She also developed abscesses subcutaneously and in the lungs, and ultimately died with pyæmic symptoms, and covered with an extensive crusting desquamative erythematous eruption. I show you this portrait to illustrate how easily more serious conditions may be mistaken for eczema.

Here is a drawing of a syphilitic foot. You sometimes see eczema of the foot with hyperkeratosis, something like this, but here we have only one foot affected, with an eruption ulcerating in parts, with a raised serpiginous outline and not itching. There are also scars of old ulcerations elsewhere.

With regard to the treatment of eczema, the thing to aim at is at first to quiet down the inflammatory condition, to remove the hyperæmia, and lessen the exudation, and at the same time to asepticise and protect the parts. One can do a very great deal by local means. If there is much exudation, perhaps the best plan is to commence with some powder containing calamin or oxide of zinc, with starch, and some antiseptic, it does not matter which. Sometimes I order half an ounce of starch, half an ounce of oxide of zinc, and one drachm of boracic acid as a dusting powder. But any other antiseptic will do as well as boracic acid. That should be thickly powdered on. Its purpose is chiefly to dry up the exudation, and to protect the surface. If there is much itching, as there nearly always is in eczema, I find the best thing is to use some weak tar lotion. Creolin and liquor carbonis detergens are good tar preparations. We use more creolin in this hospital, because it is cheaper and goes further. It is stated generally in text-books that you must not use tar for acute eczema. But we find it may be used if it is in a very weak solution; one should never use a lotion which is stronger than half a drachm of creolin to the pint, and the water should be soft and previously boiled. Some of the older authorities still believe very largely in treating eczemas with lotions constantly, that is to say, they keep moist rags on. I find that, as a rule, it is much better to bathe the parts frequently with the lotion, then dry with a soft towel, and afterwards apply a protective application. Most cases do well with ointments, some ointment which has an antiseptic, drying, and soothing effect. Something which removes the hyperæmia is the best to use at the beginning. In this hospital we use at first the following:

℞ Zinc. oxide ... ... xx grs.
Hydrarg. subchlor. ... ... x „
Plumbi acetatis ... ... x „
Ung. hyd. nitratis ... ... xx „
Vaseline or lard to one ounce.

As a rule that is very unirritating, and dries up the eczema, and improves matters very much. I always order patients to bathe first with the tar lotion, very weak, indeed, and then to apply this ointment, and keep it bandaged on, especially in eczemas of the leg where there may be congestion due to varicose veins, or simply from gravity. A very serviceable bandage for the purpose is one made of French crape, which is light, cool, porous, and slightly elastic. After the acute stage is passed, the eczema may become scaly and chronic. Then, if the above ointment is acting well, we use this:

℞ Liquor carbonis detergens ... ½ drm.
Ammoniated mercury ... ... x grs.
Vaseline to one ounce.

This is a most useful ointment for scaly, dry, itchy eczema; it also does good in some cases of psoriasis. If a stronger preparation of tar is required, we put in place of liquor carbonis detergens, creolin, oil of cade, or some other form of tar. An important point to remember in treating eczema with ointments is to avoid using very strong applications. Most of the ointments in use here contain only small amounts of medicaments. If the eczema has existed for a long time and the skin is hypertrophied, this ointment is very useful

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to use, but it may improve matters and quicken the cure if you add a little salicylic acid. In very indurated cases we have sometimes found that painting with liquor potassæ is valuable if immediately followed by the ointment. In fact, in former times attempts used to be made to turn these old chronic patches of eczema into acute eczema before treating it. That is, however, scarcely necessary, for the majority of them will do well with this ointment if applied two or three times a day after the lotion, and kept on. It is most important to avoid using anything which is irritating. For instance, common soaps and soda are almost certain to aggravate the affection. In acute cases, I find a bag of bran used instead of soap very useful.

I nearly always combine internal treatment with external. If the digestive system is disordered, I treat that with alkalies, and tonic bitters, and aperients. One of the most useful mixtures to prescribe contains sulphate of magnesia in small doses, combined with a little iron and some nux vomica, or something of that kind. In short, all concomitant functional derangements of internal organs must be suitably treated. The circulation, the lungs, the kidneys, and the nervous system must all be looked to.

With regard to medicated baths, these are very useful. They may contain starch and bran, and a small amount of tar. A favourite bath which we order here contains about half to one teaspoonful of creolin to six gallons of water. Sometimes, if the skin is very dry, it is desirable to add glycerine, about one teaspoonful to the gallon. Several cases I have seen derived great benefit from bathing in the mild sulphur waters, and many private cases, especially of the seborrhœic type, that I have sent

Harrogate have done well. No doubt success is also obtained at Buxton and Bath, but my experience is that the chronic cases do better at Harrogate. There are certain French waters which contain a little arsenic. Very few authorities now believe in arsenic for eczema, although it is still largely used for psoriasis, and pemphigus, and lichen planus. At any rate, now that the baths are so well managed at our British watering places, it is not so necessary to send patients abroad.

There are two external applications for eczema that I use largely, and must not omit to mention. Weeping inflamed cases which resist the above ointments I often treat successfully with a modification of Lassar's paste as follows:

℞ Amyli and zinci oxidi	...	āā	ʒij.
Acidi salicylici	... ...	...	gr. x.
Vaselin	... ...	... ...	ʒss.

To be thickly smeared on after bathing with the weak tar lotion.

Other cases do splendidly under the application of zinc gelatin with a little ichthyol. This melted and painted on—after the parts have been bathed with a warm antiseptic lotion—forms an external protective under which skin may soon regain its normal condition. The application should be repeated every two or three days.

A CASE OF SHRAPNEL WOUND OF SKULL.

Shown at the Leicester Medical Society, March 1st, 1901.

By N. C. RIDLEY, M.B., F.R.C.S.,
Hon. Ophth. Surgeon to the Leicester Infirmary; formerly Surgeon Royal Navy.

F. P—, æt. 36, a private in the Leicestershire Regiment, was admitted to the Leicester Infirmary on February 26th, 1901, complaining of partial loss of sight and general weakness.

On the 23rd August, 1900, during an engagement with the Boers at Belfast, South Africa, patient was kneeling under a blanket shelter to light his pipe, when he was struck on the head with a fragment from a shrapnel shell. His impression, so far as he can remember, is of a purple flash on his right side, immediately followed by an explosion and a blow on the right side of the head. He made a remark to his comrades that he was hit, and lost consciousness, remaining in that condition for a month. He was first taken to hospital at Middleburg, then to the Langman Hospital, where he was trephined, and where he stayed for about two months, being sent from there to Bloemfontein Hospital on October 14th. Here he was kept for another month, and then transferred to Wynberg Hospital for a short time, and then invalided home to Woolwich Hospital.

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being sent to his home in Leicester on sick furlough almost directly.

Patient says he first noticed that his sight was bad at Wynberg, and also that both his legs were very weak, the left being rather the worse, and his grasp with the hands was defective, his speech slower, and natural flow of words impeded. He says that both his sight and strength are improving.

Present state and personal history.—Patient is a fairly healthy-looking man, is unmarried, and has always lived a steady life. He has served in both 1st and 2nd Batallions of the Leicestershire Regiment, and in the Reserve for eighteen years. He had dysentery when in India. There is no history of syphilis, and, indeed, he has always been remarkably free from illness.

His general intelligence is good, but his memory is very defective, and he is very nervous. He has general weakness in all his muscles, and a slight tendency to tremor, but no definite local paralysis. His gait is slow and feeble, but steady. The grip of both hands is weak, but equal. His speech is slow, and he has slight difficulty in getting out some of his words, but they are quite distinctly uttered. There is no apparent loss of sensation anywhere. He has slight headache at times, but no fits and no vomiting.

On examination of the head about two inches above and three quarters of an inch to the left of the external occipital protuberance a distinct depression can be felt in the skull, admitting the tip of the little finger, around which a semicircular linear scar can be seen. About two and three quarter inches above and three quarters of an inch behind the external auditory meatus another depression can be felt about twice the size of the former, and also surrounded in part by a semicircular linear scar. This is evidently on a lower level than the former.

Cranial nerves.—

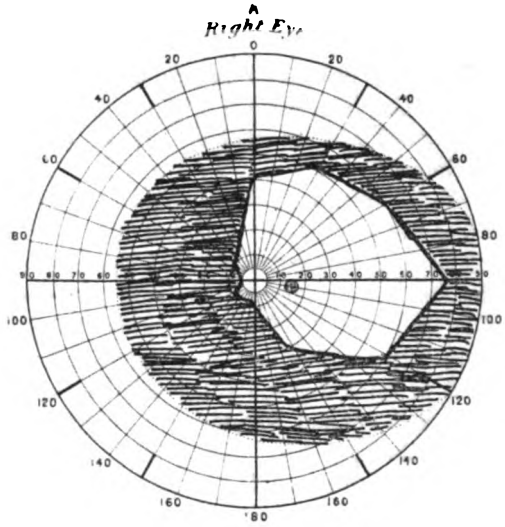
I. Sense of smell is unaffected.

II. Sight not good, the left eye being rather worse than the right.

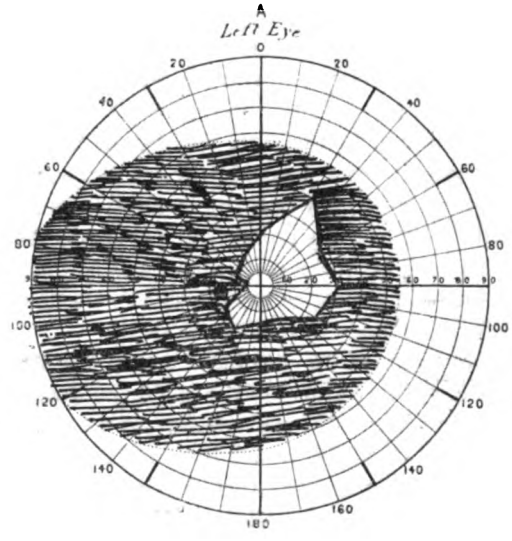
R.V. with some trouble he sees $\frac{6}{6}$ and J. 4.

L.V. ,, ,, $\frac{6}{9}$ and J. 4. (barely).

His fields of vision, as shown in the chart, are markedly contracted, the temporal half of the right retina and nasal half of the left retina being almost completely insensitive,—*i.e.* he has well-marked left hemianopsia. His right fields are



also lessened, that of the left eye more markedly so.



All colours and objects when seen are immediately recognised. He has no word blindness, no visual aphasia. The pupils react both to light and accommodation. A reaction also occurs when light is thrown upon the blind half of each retina (Wernicke's sign).

The intra-ocular tension is normal in both eyes.

Fundi.—Right disc pale; vessels of normal size. Left disc and vessels like those of right

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side, but there is a patch of retinitis near the macula, otherwise normal.

The media are clear.

III, IV, VI. No extra-ocular paralysis.

V, VII. Normal.

VIII. Slight deafness, equal on both sides.

IX, X, XI, XII. Normal.

The knee-jerks are slightly exaggerated; no ankle-clonus.

Remarks.—Although the openings in the skull may owe their size to the trephine, it is probable that their original relative size was the same, and as the aperture of entry of a missile is generally smaller than that of its exit, and as the posterior opening is on a higher level than the lateral, I am inclined to think that the shrapnel bullet or fragment of shell entered behind and emerged by the wound on the right side. The position of the man when struck (kneeling) is in favour of this, as shrapnel shell is burst in the air over troops, and the bullets are discharged obliquely downwards with not much horizontal direction; so that unless the man were lying on his left side or on his back, a position he would hardly be likely to assume in the firing line, it is difficult to see how the bullet could have travelled in the other direction.

Against this we have the patient's statement that it entered at the side, and that a fragment was removed from beneath the scalp near the posterior wound; but as he was unconscious for a month after the operation, he may easily have made a mistake in the matter, and it is manifestly difficult for a patient to say on which side he was struck by a missile traversing the skull.

I am inclined to attribute the injury to a shrapnel bullet, as this kind of shell-case does not usually break up into small pieces, and the wounds in the skull do not show any irregular angles.

Taking it for granted that the missile took a fairly straight course between the wounds of entry and exit, the parts of the brain perforated would be the left superior occipital convolution, the posterior part of the left cuneus, the right cuneus more forward, and the right angular gyrus and part of the right superior occipital convolution.

The unconsciousness may be attributed first to concussion, and afterwards to compression from hæmorrhage from the posterior branch of the middle meningeal artery, which must have been divided.

The crossed hemianopsia is explained by the fact that the greater part of the lesion is of the right visual area of the brain; and this case affords additional proof of the value of Wernicke's sign, for there can hardly be any question of injury to the optic tracts or to any part in front of them.

The contraction of the remaining halves of the visual fields is difficult to explain; it is generally present to some extent in hemianopsia. In this case one may attribute it partly to the fact that the left occipital and cuneate lobes are also damaged in part.

The central vision of both sides is good; there is no crossed amblyopia; the small patch of retinitis in the left eye will probably account for the difference in visual acuity on the two sides, but at the same time it is difficult to say what caused this retinitis.

The fact that the patient first noticed failure of sight three months after the receipt of the injury must be attributed to his defective mental condition during the earlier period. It is worthy of notice that in these cortical lesions of the visual apparatus there are no signs of atrophy of the discs.

The symptoms of general weakness are probably due to functional disturbance of the brain from the severe shock, rather than to any definite local lesion.

A skiagram taken of the patient's skull did not add to our information in any way.

As to *prognosis*, perfect recovery can manifestly never occur, as portions of the cortex must have been totally destroyed; but, on the other hand, a good deal of the present deficiency may be due to loss of function in parts only bruised and shaken, which in time may regain their former powers.

I am much indebted to Mr. Bolton Carter, F.R.C.S., house surgeon to the Leicester Infirmary, for his carefully taken notes of this case.

THE Festival Dinner of the Medical Graduates' College and Polyclinic is fixed for May 22nd, and will take place at the Hotel Cecil. The Right Hon. Arthur J. Balfour, M.P., has consented to be in the chair, and the band of the Coldstream Guards has been engaged for the occasion. Tickets can be obtained from Captain Pinch, F.R.G.S., 22, Chenies Street, W.C.

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HYPNOTISM MAINLY FROM A PSYCHOLOGICAL STANDPOINT.*

By J. MILNE BRAMWELL, M.B., C.M.

GENTLEMEN,—Instead of reading a prepared lecture, I propose talking to you somewhat informally about hypnotism. The subject is too wide and complicated to be dealt with in detail, but I will try to give you a sketch of some of the more characteristic phenomena of deep hypnosis, particularly those of psychological import, and afterwards discuss some of the theories used to explain them. I shall also be pleased to answer, as far as I can, any questions you may ask. Possibly you may put some to which I shall be unable to reply satisfactorily, but, at all events, I can give you the explanations which have been accepted by others.

First, I wish to draw your attention to two supposed characteristics of the hypnotic state, namely, sleep and *rapport*.

1. *Sleep.*—Sleep and hypnosis are generally regarded as analogous by those without knowledge of practical hypnotic work, and if the subject does not pass into a condition superficially resembling sleep, they assert that he cannot have been hypnotised. This error is partially due to the method usually employed for the primary induction of hypnosis. The operator, although he may also employ physical means, such as fixed gazing, nearly always suggests symptoms of sleep to the subject. The latter is told that his eyelids are becoming heavy; that he is feeling drowsy; that his limbs are getting numb; and, if he be susceptible, his eyes quickly close, and he passes into a condition which the untrained observer might easily mistake for profound sleep.

This method, although it undoubtedly favours the induction of the primary hypnosis, is not indispensable, and the state can be induced without the subject having passed through any condition resembling sleep. Further, once deep hypnosis

* A lecture delivered to Dr. Savage's M.D. Students at Bethlem Royal Hospital, November 8th, 1900.

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has been obtained, it can be evoked at any future time, in response to any signal suggested to the patient during hypnosis. Finally, the hypnosis induced immediately in this way need not present even the most superficial resemblance to sleep. The subject may have his eyes open and his senses alert, and be capable of intelligently discussing his surroundings, and the events of his past normal and hypnotic life.

The most profound hypnotic stages are characterised by amnesia on waking, *i. e.* the subjects are unable to recall any of the events of hypnotic life. This loss of memory is often cited in support of the "sleep" theory. It must not be forgotten, however, that (1) when hypnosis is re-induced the lost memory returns; (2) suggestion in hypnosis can prevent post-hypnotic amnesia; (3) the majority of hypnotic states are not followed by any loss of memory at all.

2. *Rapport.*—According to Elliotson and the later mesmerists, subjects were in relation by their senses with the operator, but with him alone. This view was successfully combated by Braid, who showed that the condition of the attention in hypnosis favoured response to external suggestion, but not suggestion conveyed by any particular person, such as the hypnotiser. Braid showed how suggestion easily created an artificial state in which the subjects were apparently *en rapport* with the operator alone, but this condition was an apparent, not a real, one. The subjects really heard the suggestions of others, though special artifices might be necessary in order to make them respond to them. Carpenter drew attention to the fact that *rapport* was unknown to Mesmer and his immediate disciples, and was not discovered till long after the practice of mesmerism came into vogue. The phenomena of *rapport* only acquired constancy and fixity in proportion as its laws were annunciated and received. Mesmerists, ignorant of it, produced a great variety of remarkable phenomena, but did not discover *rapport* until the idea of it had arisen in their minds, and from thence had been transferred to their subjects.

Liébeault, Bernheim, and certain other members of the Nancy School consider *rapport* a genuine condition, and one having important bearings on the explanation of hypnotic phenomena. The researches of Moll, however, have confirmed Braid's views, and there is little doubt we are justified in concluding that *rapport* is an artificial condition created by suggestion.

Memory.—The changes in memory observed in *profound* hypnosis are extremely interesting. As we have already seen, when the subject is aroused from that state he remembers nothing of what has passed. When re-hypnotised he can tell you everything that has been said or done, not only by the operator, but by any others who have been present, and can also relate his personal acts and thoughts. To this there is one exception: he cannot recall sensations which have been successfully inhibited by suggestion, and thus prevented from reaching consciousness. During hypnosis, the subject not only remembers all the events of his normal life, which are retained in his waking memory, but, in addition, others which he had forgotten, particularly things which had happened in early childhood. Thus, one subject described with vividness and accuracy what had happened on the first anniversary of her birthday.

In addition to alterations in memory, the chief characteristic of deep hypnosis is the increased power it gives over the organism, thus enabling phenomena to be evoked which are beyond the power of the waking will. Amongst these may be cited muscular rigidity, associated with absence of muscular fatigue, alterations in the rapidity and tension of the pulse, etc., alterations in the special senses, common cutaneous sensibility and muscular sense, whereby their activity may be increased, diminished, or suspended. Negative and positive hallucinations may also be successfully suggested: in the latter case the subjects believe they see what does not exist, in the former some object is made apparently non-existent.

Consciousness.—Under ordinary circumstances, the subject is conscious during the whole of hypnosis and can recall all its events in subsequent hypnoses. If questioned about his feelings, prejudices, surroundings, etc., his consciousness and intelligence are found to be in every way equal to those of his normal state. Consciousness, however, can be interfered with by suggestions, so long as these do not involve anything repugnant to the moral sense of the subject. In this way a condition somewhat resembling sleep may be induced, in which the subject is apparently insensible to sensations from the outer world; or a particular

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sensation, such as pain, may be inhibited, and general sensation left intact.

Volition.—Many people—still clinging to old mesmeric fallacy—believe that the hypnotised subject is more or less of an automaton. I, too, when I commenced hypnotic work some twelve years ago, thought that the subject was largely at the mercy of the operator. I was soon aroused from this dream, however, not by the result of experiments made to test the condition, but from the constantly recurring facts which spontaneously arose in opposition to my preconceived ideas. I sometimes found that patients who had submitted to severe operations during hypnosis, refused at a later date much less important suggestions, which they had misunderstood or disapproved of. Of these facts the following case is an illustration:

Miss C—, æt. 19, an uneducated girl, had been frequently hypnotised, and was a good somnambule. She had suffered greatly from her teeth, of which she had only sixteen left, all decayed. These were extracted at Leeds, in the presence of some sixty medical men and dental surgeons. Anæsthesia was produced by written suggestion, while I remained in another room. The operation was perfectly successful and unattended by pain, either then or afterwards. At a later date I examined her mouth and found that a fragment of one of the stumps remained. I told her to come to my house to have it removed. She mentioned this to one of her neighbours, an old woman, who advised her to have no more teeth extracted, as this would cause her mouth to fall in. The following day she presented herself and was at once hypnotised, but refused to open her mouth, or to permit me to extract the tooth. Emphatic suggestion, continued for half an hour, produced no effect. This was the first occasion on which she had rejected a suggestion. I then awoke her and asked her why she had refused to have the tooth extracted. She told me what her neighbour had said and expressed her determination to have nothing more done. I explained the absurdity of this and pointed out that, as she had only the fragment of one tooth remaining, its removal could not affect the appearance of her face. As she was still obstinate, I said "Unless this fragment is removed you cannot have your artificial teeth fitted." This argument was sufficient. She gave her consent in the waking state, was at once hypnotised and operated on without pain.

The spontaneous opposition to suggestion which I met with from time to time, led me to make a series of experiments in reference to the mental condition in hypnosis. The plan I adopted was to question profound somnambules during hypnosis as to their own mental condition. Some of the subjects chosen were well-educated and intelligent, others were working people. All practically gave similar replies, namely, that when in the hypnotic state they knew that they were hypnotised, but retained completely the sense of their own identity and relationship with the outer world. They could reason as logically as in the waking state, and were confident that they could resist any suggestion which was displeasing to them.

To the patient who was the subject of the time experiments afterwards to be referred to, experimental criminal suggestions, similar to those upon which Bernheim founds his theories of automatism, were made. During hypnosis I suggested that she should steal a watch belonging to Mr. Barkworth, a friend who assisted at the experiment. This watch was placed upon a table, and Mr. Barkworth hid behind a screen. I told the patient during hypnosis that Mr. Barkworth had gone, and had left his watch behind him; that he was very absent-minded, would never remember where he had put it, would never miss it, etc.; suggested that she should take it, that no one would ever know, etc. I awoke the patient. She took no notice of the watch. I asked her, "Where is Mr. Barkworth?" "Gone away." "He has left his watch; would you not like to take it?' The patient laughed, and said "No, of course not.' I re-hypnotised her, and asked, "What did I suggest to you a little while ago?" "That I should steal Mr. Barkworth's watch, that he was absent-minded, would never miss it, etc." "Then why did you not do so?" "Because I did not want to." "Was it because you were afraid of being found out?" "No, not at all; but because I knew it would be wrong."

At a later date I again questioned her in hypnosis in reference to this supposed theft. I said, "Did you recognise that it was an experiment?" "Yes, perfectly." Well, then, if you were quite certain that it was only an experiment, why did you not carry it out?" "Because I did not wish to do

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wrong, even in jest." I then asked her if she would put a lump of sugar into someone's tea if I told her it was arsenic, and she replied she would. When further asked why she would not be willing to take the watch, and would yet put the supposed arsenic into someone's tea, she replied as follows: "I would not take a watch, even if I knew the suggestion was made as an experiment, because this would be pretending to commit a crime. I would, however, put a piece of sugar into a friend's teacup if I were sure it was sugar, even though someone said it was arsenic, because then I should not be the one who was pretending to commit the crime." So subtle a distinction would not, I think, have occurred to the subject in the waking condition.

It is important to notice that this resistance to suggestion did not occur alone in the alert stage of somnambulism, when the subject had her eyes open and her wits apparently about her, but also in profoundly lethargic conditions, in which the subject was supposed to be insensible to external impressions. For example, one of my patients, whose anæsthesia was being tested previous to operation, permitted me to pinch her arm and prick the pulp of her thumb with a needle. On being aroused she retained no recollection of what had occurred. I attempted to repeat the experiments two days later. She permitted the pricking, but strenuously resisted the pinching. Again awaking was followed by amnesia, but when I told her what she had done and asked for an explanation, she replied, "My arm was marked by the former pinching and I made up my mind in the waking state that I would only allow you to prick me with a needle."

According to what I have observed, not only is the volition unimpaired in hypnosis, but hypnotic experiments or treatment exercise no weakening effect upon the volition in the waking state. Thus, my patients, no matter how frequently hypnotised, can always successfully resist any fresh attempt at will. In no case has any morbid craving for hypnosis been developed, or any abnormal dependence upon the operator. On the contrary, the weak-willed, vacillating, and dependent have frequently gained force of character, independence of action, and power of resisting temptation.

Strangely enough, the most marked case of resistance to suggestion I have observed was that shown by Liébeault's celebrated somnambule, Camille. When I first visited Nancy Dr. Liébeault showed me this subject, who had been frequently hypnotised and whom he regarded as a typical specimen of profound somnambulism, illustrating hypnotic automatism in its highest degree. He assured me that the suggestions he made to her were carried out with the fatality of a falling stone. He hypnotised her and suggested that on awaking she should find on opening the outer door that there was a violent snowstorm, that she should at once return, complain of this and proceed to the stove to warm herself. While so doing one of her hands would touch the stove and she would believe she had burnt herself. It was a summer's day, and, of course, the stove had not been lighted. The patient refused to accept the suggestion. Dr. Liébeault insisted for some time and then gave up the attempt, saying that she sometimes refused suggestions. He then asked her: "Will you do this another time if you will not do it to-day?" She replied: "Yes, to-morrow." On the following day the suggestion was repeated and carried out in all its details. In this instance, then, the classic hypnotic automaton, the one who was supposed to carry out a suggestion with the fatality of a falling stone, refused one, not on moral grounds, but apparently from pure caprice.

While Bernheim admits that no undoubted case of real hypnotic crime has ever been recorded, he still thinks it possible that certain subjects might be induced to commit one. This opinion he bases entirely on the laboratory experiments already referred to and believes, because the subjects accepted fictitious criminal suggestions, they would have been equally willing to have adopted veritable ones. If, however, he had questioned them in subsequent hypnosis, he would have discovered, as I did, that they only accepted his so-called criminal suggestions because they knew they were harmless, and that their appreciation of their surroundings and actions was as clear and reasonable as his own.

Post-hypnotic suggestion.—All the phenomena which characterise hypnosis can be produced by what is termed post-hypnotic suggestion. They then appear, not during the hypnosis when the suggestions were made, but at some future time fixed by the operator. Thus, it was successfully

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suggested that a hallucination should appear twelve months after the termination of the hypnosis. When these deferred suggestions are carried out the subject appears to be in his normal condition. Closer examination, however, shows that a temporary re-hypnosis has been induced, which, like the primary one, is followed by amnesia.

I now propose to draw your attention to two particularly interesting post-hypnotic phenomena, namely, automatic writing and appreciation of time. Later I shall use them as my text in discussing certain hypnotic theories.

Automatic writing.—In choosing a subject for automatic writing two things are essential, viz. (1) he must be a somnambule, *i.e.* retain no memory on awaking of what has passed in the hypnotic state; and (2) hypnosis must be capable of being induced and terminated instantaneously. Thus, when the subject is aroused immediately after the suggestion has been given, the problem must be solved in the waking state.

I have often made the following and similar experiments. I ask a subject while awake to write down a few verses; these I take charge of and do not show him again. I then make him read aloud from some book previously unknown to him, this being chosen in order to engage his entire attention. While reading, I hypnotise him suddenly, place pencil and paper near his right hand and suggest: "On waking, you will go on reading where you left off and at the same time write down how often *b* (or any other letter selected) occurs in the verses you gave me. Wake up!" He wakes, resumes reading and at the same time writes down the answer to the problem suggested. This, almost invariably correct, is often done so rapidly that I have not had time to count the letters, even with the verses before me. I now tell the subject to stop reading and ask him what he has written. He replies: "Nothing," and, when I show him the paper, is astonished and declares he does not know what it means. I then re-hypnotise him, whereupon the lost memory returns and he not only recalls the suggestion, but also the fact that he has carried it out.

Thus, the primary waking consciousness retains no recollection of the hypnotic suggestion. It does not know that the secondary consciousness, after the hypnotic state has been terminated, first solves the problems and then directs the motor acts which record them. It is also unconscious of the motor acts themselves.

Post-hypnotic appreciation of time.—At an early stage in my hypnotic work I discovered that many of my patients had acquired an increased power of appreciating time. This led to more systematic investigation, and the following is a *précis* of one of the most interesting cases which came under my notice.

The subject of the experiments was a dressmaker aged nineteen, in good health. She was fairly intelligent and had had a School Board education, but possessed no unusual arithmetical powers in the waking state, nor any particular aptitude for appreciating the passage of time.

These experiments were all of the same character. On each occasion I suggested to her, during hypnosis, that at the expiration of a varying number of minutes she should feel impelled to make a cross on a piece of paper with a pencil, and also, without looking at clock or watch, write down what time she believed it to be, and then immediately compare this with the actual time, and, if possible, obtain corroborative testimony from her friends.

The suggestions were often extremely complicated; for example, while she was in the hypnotic state and had no means of determining the time, I suggested that she should make the cross and write down the time in, say 20,190 minutes, starting from 3 p.m. the day before. Sometimes six such suggestions, similar in character, but differing as to the number of minutes, would be made quickly one after the other and only read once. Fifty-five experiments in all were made; of the result of one I have lost the record, while in another the patient had mistaken the original suggestion and fulfilled it correctly in accordance with what she thought it had been. Forty-five were carried out to the minute. In eight the patient recorded the correct time, namely, that at which the suggestion was due, but in these eight cases there were slight differences, never exceeding five minutes, between the patient's estimate of when the suggestion fell due and the moment at which she carried it out. The proportion which these errors bear to the respective intervals varies between 1 to 2028, and 1 to 21,420.

The subject had no recollection in the waking

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state that the suggestions had been made to her. After they were made she sometimes remained in the hypnotic trance in my room for an hour or more. The suggestions were arranged to fall due during the waking state, normal sleep and the hypnotic condition. This made no difference to the results. Frequently the suggestions were fulfilled in my presence, or in that of other trustworthy witnesses, when she had been for several hours either hypnotised or awake, under such conditions that it was impossible for her to ascertain the time. After a certain number of these suggestions had been fulfilled, an attempt was made to investigate her mental condition in regard to them. The subject was hypnotised between the giving of the suggestions and their fulfilment, and questioned. She stated that she had not calculated during hypnosis when the suggestions would fall due and that she had never thought of them since. Immediately before executing them, she experienced a motor impulse in the fingers of the right hand, and directly afterwards the idea of making the cross and putting down certain figures arose in her brain. To complicate the experiment still further, she was asked in hypnosis, immediately after the suggestions were made, to calculate when they would fall due. At first her calculations were frequently wrong, but this did not affect the correctness of the results. On being again questioned as to this, she was unable to explain what had happened. She said she had made no further calculations, but was sure what she had told me originally was wrong and what she had recorded was right.

(To be concluded.)

We have received from Burroughs Wellcome & Co. specimens of their Sodium Bisulphate Tabloids, and of their Quinine Bisulphate and Potassium Citrate Tabloids. The first preparation is decidedly an improvement in the therapeutical measures at our command in connection with the treatment of enteric. Sodium bisulphate possesses the valuable capacity of destroying the *Bacillus Typhosus*, and does not appear to have any laxative effect, the somewhat acid taste, moreover, tending to increase its palatability. The combination of quinine bisulphate and potassium citrate makes an exceedingly useful tabloid, and if it is powdered before adding the water, the pleasant effervescent draught resulting affords an agreeable means of exhibiting the drugs.

THREE CLINICAL LECTURES

ON

THE DIFFERENTIAL DIAGNOSIS AND PROGNOSIS OF THE COMMON INFECTIOUS FEVERS.

Delivered at the Medical Graduates' College and Polyclinic, February 11th, 1901,

By F. FOORD CAIGER, M.D., F.R.C.P.,

Medical Superintendent, South-Western Fever Hospital, Stockwell.

LECTURE II.

Gentlemen,—In pursuance of the method on which we proceeded last time, that is to say discussing these different infectious diseases according to groups, I have first of all to draw your attention to a group consisting of three affections, two of them specific, and one a comparatively mild affection, which resemble each other in respect of a papular eruption. They are smallpox, chicken-pox, and a form of lichen which is very common in young children. I take it that a well-developed attack of smallpox is not likely to be confused with anything else when the disease occurs in the confluent form; but at the same time, smallpox in a modified form—in other words, following vaccination—is very liable to be confused with other affections, and particularly with chicken-pox. In support of that statement I may say that in the last year's Report, published by the Asylums Board, out of all the cases of smallpox which were certified and sent down to the ships, exactly 50 per cent. of them were returned as being something else; and out of this 50 per cent. more than three quarters were chicken-pox. So it is obvious that chicken-pox is the condition with which we are most concerned in this connection. The differentiation of these conditions mainly rests upon the following facts:—The incubation period will not help us very much, because, although the smallpox incubation is two days less than the chicken-pox period, being twelve as opposed to fourteen, the eruption does not appear until the third day of smallpox, that is to say about the fourteenth day. In chicken-pox we have no prodromal illness—no pre-eruptive sickness; whereas in smallpox there are usually two days of illness characterised by rigor, vomiting,

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headache, and pain in the back. This pain in the back is a most distinct symptom. It is often described as of a boring character, and I have heard patients liken it to receiving blows from a sledge hammer. Probably they have never experienced such blows and lived to tell the tale, but it must be of a very severe character. Then there is the fact that the eruption in chicken-pox appears in several crops, whereas in smallpox it comes out in one crop. In smallpox the eruption may take over thirty-six hours to appear, but if a papule is going to appear at all it will become evident before the end of thirty-six hours. The appearance of the smallpox eruption is attended by a fall of temperature, whereas in chicken-pox, as a rule, the crop of papules is attended by a rise of temperature, and it is common to have three or four crops each with its own rise of temperature.

As a rule it is the second crop which is attended with the highest rise of temperature, each of the apices corresponding with a separate day. The distribution of the eruption also tends to be somewhat different. In chicken-pox it is more often on covered parts of the body, where the greatest aggregation of spots is to be seen; but in smallpox it is the face, wrists, forearms, and lower parts of the legs, which are mostly involved. Then we have the fact that the eruption develops so much more quickly in chicken-pox, coming out on the first day of the illness. It will have reached the vesicular stage by the next day at the latest, and so by the second day of the eruption the pock is at its height, after which it becomes cloudy and dries up. In smallpox it is something like three days before the papule becomes distinctly vesicular, and three or four days more before it is pustular. So that instead of having, as in chicken-pox, an eruption of which the pock reaches its full development in two days, in smallpox it takes six or seven days.

Then, as regards the anatomy of the individual pocks. In chicken-pox the pock is more superficial, there is less induration of the base, and it is altogether a lesser product. This will be particularly obvious if the vesicles be pricked. In the case of smallpox the vesicle is much harder and more resistent, and you can feel it beneath the skin before it actually becomes visible. Then there is the question of umbilication. It is often said that the smallpox vesicle is umbilicated, and that in chicken-pox is not. That, I think, is much too general a statement to make. It is true that it is the exception for the pock to be umbilicated in the case of chicken-pox, but in smallpox it is the rule for it to be so; but it would be well to avoid making the statement too general. With regard to the actual construction of the pock, in chicken-pox it is unilocular, whereas in smallpox it is commonly divided into several compartments.

And, further, there is the effect of vaccination. If the case be one of chicken-pox, and the child has not been vaccinated during the last five years, in all probability the vaccination will take. If, on the other hand, it is smallpox during the eruptive stage, vaccination is very unlikely to take. Another point would be the presence of scars. The presence of scars which point to antecedent chicken-pox is a matter, the importance of which is not sufficiently well recognised. If you carefully look over the surface of a number of a young children of from ten to twelve years of age, you will find that in probably 50 per cent. of them there are evidences of antecedent chicken-pox in the form of scars; and if the case under discussion present evidence of these scars, you may be almost certain that the affection from which the patient is suffering is not chicken-pox, because second attacks of chicken-pox are excessively rare.

There is one qualification I should make with regard to the early prodromal symptoms in chicken-pox. As a rule there is no severe febrile onset, and the rash is the first sign; but as a matter of fact, in the case of an adult, chicken-pox occasionally comes on in a very striking manner. The symptoms are high temperature, severe headache, even pain in the back, and rigors are sometimes met with. The only point of real difference in this respect is that the pre-eruptive illness is much less likely to last two days than one. In every case in which I have been consulted with regard to the diagnosis under these circumstances the case has always been that of an adult, and not a child.

In summing up the difference between these two conditions one might emphasise three points:—If you come across evidences of an eruption presenting different stages of development within a circumscribed area—for instance, a papule, a vesicle, and, perhaps, an early pustule, situated side by side, it is not smallpox you are dealing

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with. Again, if you see a well-developed vesicle situated on a spot which you are convinced twenty-four hours previously showed no evidence of eruption, you may be equally certain the disease is not smallpox. That one sign alone is sufficient to exclude smallpox. And lastly, there is the point concerning varicella scars, which I have alluded to. The presence of scars resulting from previous varicella is the very strongest evidence that the case under consideration is not that disease.

I have included a form of lichen in this group, because I have frequently seen an eruption in young children which is almost exactly like chicken-pox in appearance, so much so that unless one had known that the child had had chicken-pox previously, or could see actual scars of it, I do not think it would be possible to invariably make a diagnosis. The eruption is one which used to be described as strophulus. It consists of an eruption of red papules, which very rapidly become vascular, often showing an urticarial suggestion, so that the name lichen urticatus has been applied to them, which, however, is not strictly justified. These papules are likely to be more aggregated on the trunk, and are very rarely seen on the face or the head. They grow rather more rapidly, there is more likelihood of their becoming urticarial, and they itch, whereas the chicken-pox eruption, as a rule, does not itch. Sometimes, certainly, it is irritable, but to nothing like the extent that lichen is. I can speak feelingly on this subject, because my own boy had an attack of this disorder, which I originally regarded as chicken-pox. It was only when he had another attack a week or two afterwards—and he has had six or seven others since—that I was convinced that it was not chicken-pox after all.

We will next devote our attention to a group of diseases which are of great importance, and which are characterised by febrile sore throat: namely, diphtheria, tonsillitis, scarlet fever, and certain attacks of influenza. In a well-developed attack of diphtheria, with definite membrane, the condition is not likely to be mistaken for anything else. It is more particularly in the mild attacks—those in which either no membrane is apparent, or in which, whatever exudation there is, is of an anomalous character—that the mistake is likely to arise. In these cases a considerable amount of assistance is often to be derived from a bacteriological examination of the secretions. The method by which this is usually done is as follows. All that is necessary are two tubes, the one containing a sterilised swab of cotton wool, and the other some blood-serum, preferably Löffler's preparation, on which the culture is made. Having brought the patient into a good light and depressed the tongue, you press the swab against the back of the throat, preferably against a spot on which some exudation can be seen, rotate the swab, and then inoculate a tube by simply rubbing it up and down on the surface of the medium fairly firmly, so as to ensure complete insemination. The cotton-wool plug should then be replaced, and the tube sent off for incubation. I take it that most medical men in practice will not make their own bacteriological examination, because, owing to want of time, it is not often that a man is able to keep familiar either with the *technique*, or the distinctive appearances of the diphtheria bacillus. As a matter of fact the bacteriology of diphtheria is an extremely difficult subject, and it is nowadays so easy to get an examination made by simply sending the culture-tube to the Jenner Institute or to one of the commercial establishments, such as Burroughs and Wellcome's, or the Clinical Research Association, where, for a small fee, they will send you a report on the following day. The bacteriological test at the present day has a wide popularity, and no doubt it is of very great value. At the same time there are certain disabilities attaching to it, which makes one hesitate before accepting the test as an infallible criterion. In the first place, there is considerable difference of opinion amongst even the most competent bacteriologists as to what is, and what is not, a diphtheria bacillus. Without going far into the field of bacteriology, one might refer to the fact that there are several forms of bacilli often present, not only in healthy but in diphtherial throats, which are extremely difficult to differentiate from the Klebs-Löffler bacillus. Some of these resemble the Klebs-Löffler bacillus both in their morphological and cultural qualities, but differ in respect of their being non-virulent when injected into animals. It is customary to speak of such forms as pseudo-bacilli. But it would be better not to apply the term to one which merely differs from the Klebs-Löffler bacillus simply in respect to virulence, because we know that microbial viru-

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lence is capable of enormous modification, and at the present day we do not know the limits within which normal variation is possible. But there is one pseudo-bacillus which is very well recognised, and which is, perhaps, more common than any other, namely, that described by Hoffmann in 1886, and subsequently worked out by Löffler. I may mention that the Hoffmann bacillus is shorter than most diphtherial ones, and its tendency is to be pyramidal in shape, and to occur in pairs, with the bases in apposition. Two or three of these pairs are frequently to be seen lying parallel to each other in the microscopic field. The bacillus does not take the double stain of Neisser, it rarely developes an acid reaction when grown in broth, and it is non-virulent when injected into animals. This particular organism is not usually regarded as a diphtheria bacillus at all.

Apart from any question as to the actual identity of the Klebs-Löffler bacillus, there is this drawback, that a negative result simply means that you have failed to find the bacillus, but does not necessarily show that the bacillus is not there. I could quote to you three or four cases, two of which were fatal, in which the most distinctive clinical and post-mortem indications pointed to the presence of diphtheria, and yet repeated bacteriological examination by a competent bacteriologist—certainly one of the most competent in this country—failed to detect a single diphtheria bacillus. No doubt those were exceptional cases; but over and over again one finds that a negative bacteriological examination is contradicted by a subsequent one. I do not think it can be too firmly impressed that the diagnosis should not rest upon bacteriological evidence alone, but upon the clinical appearances supplemented by bacteriological examination. One might limit the authority of bacteriological examination in this way. Should the clinical aspect of the case be negative, even though the cultures show apparently undoubted Klebs-Löffler bacilli, the bacteriological examination should include the result of injection into animals. Of course in everyday practice if you have to wait a week for the verdict, the test is not of much practical use. On the other hand, if the clinical appearances are characteristic of diphtheria, and you find bacilli which are culturally and morphologically identical with the Klebs-Löffler bacillus, that may be regarded as sufficient, and you will be justified in accepting the bacteriological evidence. If the clinical aspect of the case be negative, and the bacteriological evidence also, I do not think we can decline to accept such negative examination, provided it has been made on at least two consecutive days, and I should prefer three. If the clinical appearance of the case is positive, and the bacteriological evidence negative, I should ignore the bacteriological evidence altogether, because it is by far the safest thing to do, and is not so likely to mislead.

Admitting that the bacteriological test, as usually applied, is not infallible, it is very necessary to be familiar with any clinical points of difference between diphtheria and other affections resembling it, and it is especially in respect to follicular tonsillitis that difficulty is likely to arise. The points which I think are worthy of remembrance in this connection are these:—In follicular tonsillitis the exudation is, for the most part, only in spots; it does not often coalesce into a definite pellicle, and even if it does, it very rarely extends beyond the tonsil. I believe it sometimes encroaches on the back of the pharynx, but never, as far as I know, extends to the palate. That ought to be sufficient to make one feel at any rate pretty certain that the case is one of diphtheria. In follicular tonsillitis the inflammation is most likely to be about equally marked on both sides; whereas a diphtherial affection is frequently more marked on one side than the other. The febrile symptoms are likely to be pronounced in tonsillitis, and it may be said without fear of contradiction that the constitutional disturbance generally is more likely to be severe in follicular tonsillitis than in a case of diphtheria sufficiently mild to be mistaken for it. In addition to that, rhinorrhœa is much less likely to occur in follicular tonsillitis. Albuminuria, too, is less common, and there is no likelihood of cardiac implication or subsequent paralysis supervening. By careful attention to these points one can feel fairly secure in most cases.

Now with reference to the differentiation between diphtheria and scarlet fever there are two sources of confusion. In the first place, diphtheria is not infrequently attended with a rash; on the other hand, scarlet fever is often attended with an exudation. In respect to the diphtherial

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exanthem, it is, as a rule, simply an erythema, being neither papular nor punctiform; it is probably limited to the trunk, and it is also transient, rarely lasting more than forty-eight hours; whereas the rash of scarlet fever is more likely to remain visible for five or six days. Another point in favour of diphtheria would be that the surface of the throat would probably be of a pinker tint, and more glairy-looking than it usually is in scarlet fever. The typical scarlet fever throat is of an angry red, and somewhat dry and sticky-looking, whereas in diphtheria it is often pinkish, and presents a slippery appearance. You may think this a somewhat curious term, but I do not know of a more descriptive one. It is a feature which is very distinct in many cases of diphtheria. Albuminuria is likely to arise both in diphtheria and in scarlet fever, but in the former disease at an earlier date. The amount of pulse depression in a sharp attack is likely to be greater in diphtheria than in scarlet fever.

In a case of scarlet fever which is likely to be mistaken for diphtheria, the fact that exudation is not infrequently present on the tonsils in scarlet fever is not as well recognised as it should be. I think it was Professor Henoch, of Berlin, who first referred to this feature, and it is now well recognised by those who see a good deal of these diseases. At the same time I do not think its occurrence is often mentioned in the text-books. The exudation in scarlet fever is more likely to be of a cheesy consistence and yellowish-looking, and can usually be broken up and removed with a brush; whereas in diphtheria it is more likely to be thick and adherent, and if forcibly removed will probably leave a bleeding, excoriated surface. The faucial lesion in scarlet fever is much more likely to be of an ulcerative character than in diphtheria, and the ulceration is liable to extend and be accompanied by all the phenomena of a septic attack. But as a matter of fact, in scarlet fever the other symptoms of the disease are probably apparent; there is a well-marked rash, the tongue is characteristic, and there should not be much difficulty in detecting it. The difficulty consists in deciding as to whether it is scarlatinal simply, or whether it is a case of scarlet fever *plus* diphtheria. I can only say that the majority of such cases are purely scarlatinal. In a certain number of cases of scarlet fever an exudation is present during the acute stage, but in the larger number the diphtheria arises during convalescence. This post-scarlatinal diphtheria used to be the scourge of the fever hospitals before the introduction of antitoxin.

The distinction between tonsillitis and scarlet fever is not always easy. Tonsillitis is liable to be mistaken for scarlet fever mainly for two reasons. In the first place, tonsillitis may be accompanied by an eruption; and secondly, scarlet fever may show no eruption whatever. Those cases in which scarlet fever shows no eruption are nearly always in adults, especially when they have had a previous attack. Should the attack be in a child it is, *prima facie*, more likely to be one of scarlet fever than tonsillitis. In scarlet fever, moreover, you will probably get some further evidence later. The tongue will usually show some degree of peeling, at any rate, and in an adult there will probably be some rheumatic pains about the wrists or fingers towards the end of the week, apart from the special complications which are likely to arise during convalescence.

With regard to influenza, that disease occasionally assumes what might be described as a faucial form, and it may be within the experience of many here to have seen a whole series of attacks which conform to this type. In some cases the distinction between influenza and ordinary tonsillitis is very difficult. I think, however, that some stress should be laid upon the following points. In influenza the development of the attack is likely to be attended with more distress. The severity of the headache is very great, and it is frequently localised behind the eyeballs. Vomiting is more likely to be present, and there is very likely distinct depression of the pulse, and even cardiac irregularity, which in some cases is dependent upon cardiac dilatation. The tongue, as Dr. Goodhart has pointed out, is coated, pale, and often flabby in influenza, with a tendency to become indented against the teeth. The breath is particularly offensive, and the same thing is true of the exhalation from the skin. In influenza the skin is liable to become bathed in frequent perspiration, an appearance which one generally associates with excessive weakness, and this is liable to persist during convalescence. Influenza, like tonsillitis, sometimes occurs in a young child, although far more frequently it is an affection of later life.

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Diphtheria affecting the laryngeal tract forms one of a group of three affections which are characterised by the presence of croup, and therefore liable to confusion. Included in this group are the following conditions :—Diphtheria or membranous croup, catarrhal or inflammatory croup, laryngismus or spasmodic croup. As regards spasmodic croup, one can usually dispose of that pretty easily, and thus clear the ground. In most cases the attack comes on suddenly at night. It passes off completely in the interval between two paroxysms, and it is probably dependent upon some reflex cause, which may usually be determined, beyond which it is almost entirely confined to very young children. These points should be sufficient to denote laryngismus. At the same time, during both membranous croup and catarrhal croup you may get an amount of spasm which may cause considerable variations in the amount of dyspnœa.

With regard to the distinctions between catarrhal and membranous croup, it does not do to place much reliance upon a history of exposure to cold, or the fact of the child having been subjected to the possibility of infection. The diagnosis is really very difficult at an early stage in the absence of any faucial exudation, and I know of nothing so trustworthy as a bacteriological examination of the faucial, or, better still, the laryngeal mucus, by passing a swab mounted on a bent wire into the top of the larynx, and inoculating a tube from it. To those who are sufficiently familiar with the bacteriological *technique*, and are possessed of a high power microscope, an immediate examination of the material on the swab is well worthy the making, because one can often get direct evidence at once, instead of having to wait for the culture to grow and be examined. In something like one third to one half of the cases the evidence to be derived from an immediate examination of the swab is sufficient for a diagnosis.

Very often catarrhal croup is really an early sign of measles, and, of course, in such cases we may derive much assistance from the detection of Koplik's spots, which I mentioned last time. There is no condition in which these spots are more valuable than in respect to the differentiation of the early stage of measles from laryngeal diphtheria. It is true that cases of catarrhal croup are never fatal, but the fact is not of much assistance in the early diagnosis of the condition.

It now remains for me to say a few words about an important group of diseases in which the presence of continued pyrexia is the fact in respect to which they most resemble each other. There are several serious affections included in this group, namely, enteric fever, typhus fever, pneumonia, influenza, meningitis, and ulcerative endocarditis.

In all these affections there is often during the early stage nothing very distinctive, beyond the fact of a general febrile condition. At the present day a good deal of interest is concentrated on what is known as the "Widal reaction," in respect to the diagnosis of enteric. It should really be called the "Grüber-Durham reaction," because it was Grüber and Durham who discovered it long before Widal applied it as a test for enteric fever. As a matter of fact, I believe A. Grünbaum claims priority in 1886; but still the reaction is commonly spoken of as the "Widal test." It relates to the power which is possessed by the blood-serum of a person suffering from enteric fever of causing the bacilli in a twenty-four hours' culture of enteric to range themselves together in groups, and lose their motility, instead of being scattered all over the field of the microscope in active movement, as they normally would be. Seeing that normal blood-serum, or blood-serum but little diluted, is capable of causing a certain amount of clumping, and that an ordinary drop of culture unmixed with serum will often show some clumping in certain cases after a time it is evident that some limit must be placed upon the degree of dilution, and the length of time within which the reaction must take place. For practical purposes this can be fixed at half an hour with a dilution of 1 in 20 or 1 in 30. In the earlier experiments a dilution of 1 in 10 only was used, and it was found that many cases gave the agglutination reaction, which really would not have given it had the experiment been a little more exacting. I think a dilution of 1 in 20, acting for half an hour, may be regarded as the limits within which the reaction should occur. On looking up the published records of this test in order to estimate its authority, I find that in two series of carefully recorded results by two different observers, representing altogether a total of 309 cases, in 203 instances the subsequent progress of the disease, or the post-mortem evidence, showed they were cases of

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enteric, and in 103 instances the clinical indications proved that the disease was not enteric. Amongst the 203 positive cases the reaction failed in only five, although in seven others it was not very complete. In the 103 negative instances the reaction came off only once, and that, curiously enough, was in a case of typhus. So that out of 309 experiments, in only six, or rather less than 2 per cent., did the Widal test fail to confirm the diagnosis. Unfortunately the reaction cannot be obtained until about the beginning of the second week, and in some cases it cannot be obtained until the end of the second week, or even later. Taking the test as it is, and looking at its practical value, I think we may say that in about 95 per cent. of cases it may be accepted as yielding evidence of value.

With regard to its clinical employment, thinking that it might be of interest to members, I have brought with me two or three of the tubes which are used for the collection of the blood-serum. The method of procuring blood for the examination is this. One of these "Pakes's tubes"—a capillary pipette with a bulb in the middle—is held against a point of the skin which you have pricked with a clean needle, and the blood which exudes immediately runs up by capillary attraction into the bulb, and in that way you can get as much blood as you need. A good deal of difficulty is sometimes experienced in obtaining sufficient blood from the puncture, but if you go the right way about it you will find no difficulty on that score. The lobule of the ear is an excellent part from which to draw blood. It should be pricked on the external border, rather behind than in front, and the blood squeezed out by pressing it between the finger and thumb by an action similar to that employed in milking a cow. You will see that two of these tubes have been filled with blood; the ends have been closed by heating them in a flame, and the tubes afterwards have been stood on end. The serum then separates out from the clot in sufficient quantity to make any number of examinations.

ACUTE INTUSSUSCEPTION.

Clinical Lecture delivered at the Hospital for Sick Children, Great Ormond Street, on February 14th, 1901,

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GENTLEMEN,—As you know an intussusception is an invagination of one portion of intestine into the part beyond it. There are several different varieties, named from the part of the intestine affected; these are ileo-cæcal, enteric, colic, ileo-colic, and rectal. There are also two other much rarer forms, the cæcal, and the form which sometimes occurs in a Meckel's diverticulum. Of these the ileo-cæcal is much the commonest variety. In it the ileo-cæcal valve becomes invaginated into the ascending colon, carrying with it the cæcum and the vermiform appendix, so that as the invagination increases the ileo-cæcal valve always forms the most advanced point. The ileo-colic form, which is much more rare, commences as an invagination of the terminal portion of the ileum through the ileo-cæcal valve. After the intussusception has reached the length of a few inches, however, no more ileum passes in, but the cæcum and then the colon become invaginated. In the case of the other varieties the name is sufficiently descriptive.

Turning now to the anatomy of an intussusception you will see from this diagram that it consists ordinarily of three layers. Sometimes, however, though rarely, the intussusception may be double, when it will consist of five layers. Of the three usual layers the outer one is known as the sheath or intussuscipiens, the inner two layers together being called the intussusceptum. The most advanced point of the intussusceptum is called the apex, the part where it becomes continuous with the sheath being known as the neck. You will notice also that the chink between the sheath and the intussusceptum is bounded by mucous membrane, and is continuous with the lumen of the bowel, whereas that between the two layers of the intussusceptum is bounded by peritoneum, and is continuous with the peritoneal cavity. Moreover, between these two layers of the intussusceptum there is a part of the mesentery or mesocolon as the case may be. This, if an intussusception is

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unravelled, will be seen to be triangular in shape, the apex of the triangle being situated at the apex of the intussusception, the broad base being at the neck, so that the greater the length of intestine in-

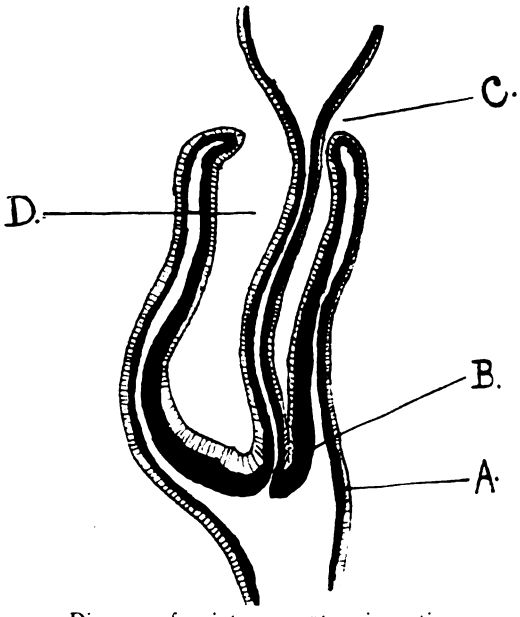

Diagram of an intussusception in section.
A. Sheath or intussuscipiens. B. Apex. C. Neck.
D. Space occupied by mesentery.

vaginated the wider will be the base of this triangle, and the tighter therefore will it be compressed at the neck of the intussusception. As the intussusception increases the tension on the mesentery that is drawn in also increases, the greatest tension being, of course, on that part of the mesentery attached to the apex of the intussusception. The tension thus produced by the drag on the mesentery brings about the characteristic shape of the tumour, which is curved with the concavity towards the inner or mesenteric side, the apex being more or less tightly pressed against the inner wall of the sheath.

Now let us consider the effects of all this. In early stages the lumen of the bowel may be patent, but very soon obstruction or incarceration, and then strangulation, are brought about. The cause of this becomes apparent on considering once more the included portion of mesentery. The tightness at the neck soon begins to cause some obstruction to the venous return with the result that the intussusception and the mesentery become engorged. They also become swollen, partly owing to this venous engorgement, and partly owing to serous exudation into the tissues.

This engorgement and infiltration produce *three* important effects.

1. Increased secretion on the part of the mucous glands, and hæmorrhages from the giving way of small engorged vessels, cause a collection of blood and mucus within the bowel. The discharge of this per anum constitutes one of the most important symptoms of intussusception.

2. Obstruction to the lumen of the gut is caused, and so another symptom is accounted for.

3. The infiltration and engorgement react on the mesentery itself, and increase the pressure on it, particularly at the neck, which is the tightest part. In this way the arteries become compressed, and so the blood-supply to the part is stopped, and the intussusception strangled. Further, the strangled part is rapidly infected by the organisms present in the intestine, and septic absorption and poisoning are thus brought about.

A certain amount of peritonitis is also soon set up, glueing the layers of the intussusceptum together, and also causing all the layers at the neck to become adherent to one another.

If the patient lives long enough the whole of the gangrenous intussusceptum may separate at the neck, and be passed *per anum*. In this way a natural cure may very rarely result.

The causation of intussusception is not by any means clear, although occasionally a definite cause can be assigned to it. In some cases a tumour, usually a polypus, projecting into the bowel, acts as the cause, probably by exciting contractions in the neighbouring portion of the bowel, and so becoming gripped and drawn in. It is known also that irregular contractions will produce invaginations; for sometimes at the moment of death, or just after, several intussusceptions are produced, some of these being at times retrograde; and it is well-known that just at this time irregular waves of contraction do occur. During life similar contractions may be caused by enteritis or the irritation set up by some indigestible article of diet. Bearing this out, there is occasionally the history of an attack of diarrhœa, or of injudicious feeding just before the onset of the symptoms of intussusception.

Turning now to the clinical side of the question, I will take as my text the following two cases

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that were recently under my care at Guy's Hospital.

CASE 1.—A male child, aged five months, was admitted into Guy's Hospital with the following history. Up till 11 a.m. on the day of admission he was quite well; then he refused to take the breast, and appeared to be in pain. An hour later he vomited once, and soon after passed some blood and slime *per anum*. The pain apparently got worse, and blood and slime passed on several occasions before admission, but there was no further vomiting.

I saw the child on admission eleven hours after the onset of symptoms. There was then no evidence of pain or discomfort, as the child lay quite quiet. The abdomen was neither distended nor rigid, and moved well on respiration. On palpating deeply over the region of the ascending colon an ill-defined mass could be felt; this was about three inches long, and was quite fixed, but its exact shape could not be determined. No tumour could be felt *per rectum*, but the bowel was found to contain blood-stained mucus.

Chloroform was administered, and about fifteen ounces of milk and water were injected into the rectum, the hand being meanwhile kept on the tumour. After a few minutes the tumour entirely disappeared, and was thought to have been satisfactorily reduced, so the child was put back to bed. Half an hour later, however, the tumour could again be felt; it was therefore decided to operate. The child was thoroughly wrapped up in warm cotton wool and a little chloroform administered. I then opened the abdomen by means of an incision about two inches long in the lower part of the right linea semilunaris. The intussusception was hooked up into the wound, and quite easily reduced. It was of the ileo-cæcal variety, and was about three inches long. The bowel was congested, and somewhat swollen, but there was no sign of peritonitis, so it was returned, the abdomen rapidly closed, and the child put back to bed.

The child gave no further cause for anxiety and made a rapid and uninterrupted recovery.

CASE 2.—A female child aged 5 months, I saw on August 3rd, at 6 p.m. The history was as follows: On the evening of August 1st, forty-eight hours before I saw the patient, some blood was passed *per anum* and the child seemed unwell, but not in any great pain. These symptoms continued and the abdomen became somewhat swollen. After twenty-four hours, a diagnosis of intussusception having been made, chloroform was given and about twenty-five ounces of warm water were injected into the rectum and the tumour apparently reduced. Shortly afterwards, however, a tumour became evident again, and another injection was therefore made, with a like result. Next morning the child seemed better, but in the afternoon at 4.30 some more blood-stained mucus was passed.

When I saw the child forty-eight hours after the onset of the symptoms, the abdomen was somewhat distended, and also rather rigid on the right side. An indefinite mass could be felt in the region of the ascending colon and hepatic flexure, but no variations in consistence could be detected, and its exact shape could not be made out. Rectal examination was negative.

It was decided to operate at once. The operation was similar to that in Case 1, except that reduction was not nearly so easy to accomplish, and that after reduction the amount of swelling and congestion of the bowel was seen to be more than in the previous case.

After the operation, however, the child gradually sunk and died six hours later.

At the autopsy no return of the intussusception was found, and there was no peritonitis; the child therefore probably died from the shock of the operation.

The *mode of onset* is very variable. In acute cases it is usually sudden, as in Case 1, but often, especially in small babies, it is very difficult indeed to say when the intussusception began. This was so in Case 2.

Pain again is extremely variable. Although it was not at all a marked feature in either of these cases, it may be a well-marked symptom, so that the child lies curled up and resents interference and examination.

Again in older patients it seems as a rule to be present, and sometimes has a distinctly paroxysmal nature, the attacks of pain doubtless corresponding to waves of peristalsis.

Vomiting is certainly usually present, and as a rule is persistent. You will notice, however, that Case 1 only vomited once, and Case 2 not at all. This serves to emphasise the fact that vomiting must not be by any means always looked for in

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these cases, and you must not therefore attach much importance to either its presence or absence, when making a diagnosis.

Constipation, more or less complete, is the rule, in the later stages of the case. For you will remember that there need not necessarily be obstruction from the outset, although this usually sets in after a time, owing to the swelling of the bowel and mesentery. At the onset there is commonly a little diarrhœa, followed later by constipation; but in any case the tendency is for complete obstruction to eventually take place.

Passage of blood and mucus.—This is an extremely important symptom, because it is nearly always present in some form or another. There may be much mucus with very little blood, or blood may be passed in considerable quantities; or, again, both the mucus and blood may be in quite small amount; in almost every case, however, the symptom will be present in some degree. Even in the rare cases in which nothing is passed, rectal examination will nearly always demonstrate the presence of blood-stained mucus within the anus.

So much for the clinical history, now for the examination of the child.

Distension of the abdomen is not usually marked, although the obstruction is commonly in the large intestine. In the later stages, however, when peritonitis has been set up, distension becomes a prominent feature.

Rigidity again, is not generally present in the early stages, and as a rule is also associated with peritonitis. In Case 2, however, there was distinct rigidity of the right side of the abdomen, although there was no peritonitis.

A *tumour* will be felt on careful palpation in about 50 per cent. of the cases. It is generally situated somewhere along the course of the colon, and more commonly on the right side than the left. You will remember that in Case 1, the tumour was in the cæcal region; in Case 2 it was near to the hepatic flexure. In shape the tumour is somewhat like a sausage, and it can sometimes be felt to be curved, the concavity being towards the umbilicus, the cause of this being the pull of the mesocolon. Very frequently, however, only an ill-defined mass can be felt, as was the case in both the examples I have described to you.

During the examination of the tumour you may be able to feel that it varies in consistence, becoming hardened and then soft again. This is very typical of intussusception, and is doubtless due to peristalsis. Although in a large proportion of cases a tumour can be felt, you must remember that frequently, particularly when the case happens to be of the enteric variety, nothing in the nature of a tumour can be made out, so that you must be prepared to make a diagnosis of intussusception in the absence of a tumour.

Finally, a *rectal examination* must always be made. In some cases a tumour caused by a quickly advancing intussusception, can be felt with the finger, even close to the anus. Again, the discovery of blood-stained mucus may give an important clue to the case. Lastly, bimanual examination, between one finger in the rectum and a hand on the abdomen, may reveal the presence of a tumour that had been previously missed. This is a very useful method of examination in children owing chiefly to the small size of the pelvis, and often is the means of gaining important information even when simple palpation has been entirely negative. Lastly, we come to the question of *treatment.*

There are two methods of treatment available, distension and laparotomy.

1. *Distension.*—The colon may be distended either with air or water, and of these the latter is perhaps the more frequently made use of, the chief reasons given for the choice being that the force is more powerful, and that the amount of pressure used can be more correctly gauged.

Personally I should prefer to make use of air-inflation, for the following reasons:

(1) Air being a gas is compressible, and is therefore less likely to cause damage to the bowel, when fully distended.

(2) Serious consequences have followed distension with water, many times the bowel has been ruptured, and on other occasions serious and sudden collapse has taken place, even resulting in death.

In order that distension may be successful the intussusception must be reducible, and moreover must be fairly easily reducible, because the amount of force that can be brought to bear in this way, is necessarily not very great. Now the duration of the case has a most important bearing on the question of reducibility, as may be gathered from

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the following figures of Gibson's, based on 187 cases. On the first day 94 per cent. were reducible, on the second day 83 per cent., and on the third day only 61 per cent. Reduction in these cases was moreover accomplished digitally, with the abdomen open, so that the number of cases reducible by distension would be very considerably less. It is quite clear from this, therefore, that distension can only be expected to succeed in quite early cases.

But let me tell you what I can of the actual results of distension. In the first place, you will remember that it was not successful in either of the cases I have described to you. Mr. Eve collected twenty-four cases from the records at the London Hospital, in none of which was distension alone successful. Mr. Barker tried distension in eight cases, in all of which it failed. Finally, in a large collection of cases by Dr. Wiggins, there were seventy-two cases in which distension was tried, and of these it failed in 75 per cent.

Distension, therefore, is only of actual use in a very small proportion of cases, and probably only in very early cases. Now apart from this, has distension any actual disadvantages? I think it has and the most important appear to me to be the following:

(1) The danger, already mentioned of rupture of the bowel or sudden collapse.

(2) Loss of valuable time, rendering the result of a laparotomy less likely to be successful. This is chiefly due to the fact that it is impossible to tell whether distension has completely reduced the intussusception, therefore the only course is to await the return of symptoms. This as we have seen takes place in the great majority of the cases. It did so in both the cases here described, and in the second one the bowel was distended with water a second time, with a second relapse, so that at the operation an anæsthetic was given for the third time in twenty-four hours. Surely this alone was almost enough to bring about a fatal result in so young a child.

(3) It will be of no use in enteric intussusceptions (which form 22 per cent. of all cases), and probably of no use in ileo-colic intussusceptions (which form 12 per cent.), so that in 34 per cent., or in one case in every three, it is practically certain to fail.

(4) It is unscientific, because its action cannot be accurately followed, or its effect accurately gauged.

To sum up, then, the position is practically this, that distension will be very rarely successful, and even then only at the expense of grave risks.

I should advise you therefore not to make use of distension at all, but to open the abdomen as soon as possible after the diagnosis is made. If you do, however, decide to try distension first, use air, and try it only in very early cases, certainly not later than twenty-four hours from the onset The best way to inflate the bowel with air is to use a Lund's inflator, and to do it with the child completely anæsthetised, keeping the hand on the tumour, so that the progress of reduction can be closely followed.

2. *Laparotomy.* — According to Gibson's list, already mentioned, the mortality of operation in recent years has been 51 per cent. in a total of 187 cases. Probably the results in the future will be even better than this, for in many of the cases in this list distension had been tried one or more times before the operation. Every precaution must be taken against shock, and with this end in view, the exposure of the child must be as little as possible, and the operation must be as rapid as possible. The child must therefore be thoroughly wrapped up in cotton-wool, and the table and room must be well warmed.

The abdomen may be opened either by an incision in the right semilunar line, or by one through the linear alba; if a right-sided tumour is present the former should be used, if not, the latter. Two fingers feel for the intussusception, and then an attempt is made at reduction without bringing the mass outside the wound by pressing on the apex of the intussusception, and *not by pulling on the neck.* If reduction can be accomplished there is nothing further to do but to close the wound. If however reduction fails, the further treatment becomes most difficult, and is attended by a very high rate of mortality—82 per cent. according to Gibson, and even higher than this according to others. I fear that time will not allow us to go into this question of the treatment of irreducible intussusception beyond saying that a choice has to be made between resection, the formation of an artificial anus, and the procedure known as Barker's operation, the principle of which is to excise the intussusceptum through a longitudinal incision in the sheath, and to unite the layers at the neck by sutures.

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WITH MR. WATSON CHEYNE AT KING'S COLLEGE HOSPITAL,

FEBRUARY, 1901.

Badly United Fracture of the Tibia and Fibula.

THIS patient is a man well on in years, and the question in his case is as to the best method of treatment. He had an accident seven months ago, when, in moving off the pavement to make way for a lady to pass, he slipped on the curb with his foot doubled under him. The result was an oblique fracture of the lower end of the tibia and of the fibula, with shortening and eversion. The skin was not broken. He cannot walk, and standing causes much pain. His age is fifty-six, and he is completely crippled. He has really three deformities:—The foot as a whole is displaced outwards; the leg is shortened; and there is marked eversion of the foot. The chief troubles are the displacement outwards and the eversion. The shortening can be compensated by a boot, and we need not trouble about it, more especially as it would be impossible to remedy it now, seeing that all the tissues, muscles, periosteum, and fibrous tissue are contracted. But I think we can overcome the other two sources of trouble. I propose to cut down on both fractures, divide them along the line of union, and take out a sufficient amount of bone from the tibia to allow the foot to come inwards as a whole. We can at the same time force the foot in, and with a little loosening of the tissues around the fibula we can overcome eversion. After having got it into a proper position I shall fix the ends of the tibia together with plated screws, and, perhaps, put some nails in the fibula.*

Fracture above the Condyles of the Femur.

I had another case of fracture which I operated on last Wednesday, in which I used another method of fixing the bones. It was the case of

* The operation was performed two days later on the lines described above, and the foot was restored to its normal position, and the tibia fixed by screws. On March 1st the dressing was changed, the wound was found healed, and the foot was in proper position.

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a boy who fell on his knee, and broke his femur transversely above the condyles. The upper fragment was driven downwards, and split the two condyles, and pushed its way through between the split ends, and projected behind at the lower end of the popliteal space. The condyles were also turned a little back, but not to any great extent. We failed to correct the fracture properly by manipulation under chloroform, by extension, by weight and pulley, or by splints, and therefore I cut down on the outer side of the lower part of the thigh, making a long incision, and exposed the fracture, and separated the soft parts around it. Even then it took three of the dressers pulling on the leg before we succeeded in pulling the leg down, and getting the upper fragment out from between the two halves of the condyles. On pressing the condyles together, I was able to get the bones into accurate position. But they would have slipped again if I had left it alone. The bones were thin and fragile, and would not have held a screw, and, besides, there was no obliquity of fragments. I accordingly took a thin sheet of aluminium, with numerous holes perforated in it, bent a piece to the required shape, and tacked it down with nickelled tacks on to the bones above and below the fracture. This plate acted as a splint.* I should like you to note especially the value of this aluminium sheet as a means of fixing bones together which have been divided transversely. I first used this method in a case of coxa vara some seven years ago. In that case, where there was so much eversion that the child could not walk, I divided the femur transversely below the trochanters, and, leaving the displacement of the hip-joint untouched, inverted the leg, so that I got the foot into the position which it ought to occupy in complete inversion. I prevented it from twisting back again by fixing the fragments together with a plate of aluminium in the manner above described. The wound healed by first intention, and the child went out with the leg in excellent position, and cured so far as the deformity went. But about three years afterwards the child came back with an abscess in the thigh, and when I opened it, I found the plate with the nails loose at the bottom of the abscess. I pulled them out, and the abscess quickly closed. It was in for three years without giving any trouble, and then, I presume, the child fell below par, and bacteria, which had got into the blood, found that the locality where this plate was was a weak spot, and they settled there, and caused the abscess.

* In this case also the wound healed by first intention, and the patient was sent out three weeks after the operation with the limb in plaster of Paris, and the fragments in perfect position.

Knee Disease in a Hæmophilic.

This is a patient who came some weeks ago with all the symptoms of internal derangement of the knee-joint. He had a great deal of pain in his knee even at rest, and when he walked the joint was always catching and giving him pain. The joint was evidently rheumatoid; it was not swollen, and I concluded that some hypertrophied fringes of synovial membrane got in between the ends of the bones, and caused the difficulty. The trouble persisted in spite of treatment, and it became evident we must try and do something for him in the way of operation. Accordingly we opened the knee-joint, and found that the case was essentially one of rheumatoid arthritis, with a sharp razor-like outgrowth from the cartilage, which was the cause of the pain. But afterwards we found that we had operated on a hæmophilic, and we had the greatest difficulty in arresting the hæmorrhage, which recurred profusely from time to time. We had, in the first instance, to open up the whole wound, and pack it; but after a few hours, or whenever the dressing was changed, bleeding again occurred. Various styptics were tried, but ultimately the administration of chloride of calcium and the local application of supra-renal extract brought the bleeding to a stop. The wound ultimately granulated, and was then successfully skin-grafted with skin from another individual. The patient gave us no history of bleeding before, while there was nothing in the history or character of the joint to lead us to suspect hæmophilia; and although he had had difficulty in the same way after the extraction of teeth, he did not think it necessary to tell us. Since then other joints have gone wrong. In the right elbow there are at present the remains of a recent hæmorrhage. It became painful, swelled up, and there was an ecchymosis afterwards around. The left elbow has also been swollen and painful several times. It must be borne in mind that a hæmophilic joint, after repeated attacks of hæmorrhage, undergoes

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changes very much like those seen in rheumatoid arthritis, and I do not know how, in an advanced case, you could distinguish the two conditions pathologically.

This boy has *paralytic talipes equino-varus.* The deformities are inversion of the anterior part of the foot, and the foot will not bend up to a right angle. There is also another deformity which is extremely important, and often overlooked in the treatment of club-foot, namely, that the os calcis is inverted. That leaves the sole of the foot at the heel looking inwards. You are therefore liable to leave the posterior part of the inversion untreated, and that is a very difficult part to remedy. He is now fifteen years of age, and the bones and other structures of the foot are permanently deformed, and there is no possibility of doing anything by such a simple procedure as tenotomy. I propose, first of all, to take a wedge out of the tarsus, so as to bring the foot straight; then divide the tendo Achillis, and then, if we find the sole of the foot is not right, we will take out a small wedge at the articulation between the astragalus and the os calcis on the outer side, so as to bring the os calcis into a vertical position. Afterwards he will have to wear an apparatus on account of the paralysis.

This little girl, æt. 4½, is the subject of *congenital dislocation of the left hip*, which has been under treatment for some time. I show you a skiagram of the case before it was treated. In the skiagram you see the head of the left femur is out of the acetabulum. There are two ways of treating congenital dislocation, one the operative, and the other non-operative method. One set of operations consists essentially in enlarging the acetabulum, and putting the head into that enlarged acetabulum. In order to do that the head, which is very often flattened and dwarfed, is pared, so as fit the aperture. The other set consist in making a new acetabulum. Another thing which is sometimes done is to lift up the periosteum and a piece of bone in the ileum above where the acetabulum ought to be, so that it ossifies, and forms a sort of buttress. The result of these operations is very fair on the whole, but it has been found lately that in the majority of cases you can get a still better result without operation. This treatment consisted in reducing the dislocation, preceding the reduction by violent stretching of the limb, so as to stretch all the ligaments. Pulleys are used in the first instance to stretch the parts, the region of the hip being well manipulated at the same time; the limb is then moved, so as to try to peel off the capsule from the acetabulum, such movements being chiefly hyper-extension and rotation outwards. After that the head is reduced by the ordinary manipulations—flexion, abduction, and rotation outwards. If the parts have been sufficiently prepared, the head of the bone will be found to slip into place, and so long as the limb is kept fully abducted it will remain there. It is, however, very unstable, and if the limb be adducted it will at once slip out again. The limb and pelvis are then put up in plaster of Paris in the fully abducted position, and the patient kept in bed with the plaster case on for two or three months. A skiagram should be taken from time to time to ensure that the head of the femur is in proper position. When the plaster is taken off it will be found that the limb can be a little more adducted without the head of the bone slipping out. Test how far you can go with the adduction without the bone slipping out, and put the limb up in plaster again in that position for about six weeks or two months. At the end of that time a little more adduction can be gained, and with the plaster case on, the child may be allowed to walk. The pressure of the limb in walking bores the head of the bone into the acetabulum, and leads to the formation of a better acetabulum. At the end of six to twelve months, after several re-applications of the plaster, you can allow the child to walk by itself, and the condition is practically cured. In this case Mr. Burghard was unable to keep the head of the bone in its place, and so he cut down and cleared the parts. He deepened the acetabulum, put the head of the bone into its proper place, raised the periosteum above the acetabulum, so as to make a buttress, and put the limb up in plaster. The result of that is shown by the skiagram I show you, with the bone in very good position. You see that the patient now walks very fairly.

Mammary Cyst.

Here is a woman of about forty years of age who comes complaining of a lump in her breast; she says she found it first three months ago. You see that the left breast looks very distinctly fuller than the other, and there is a large rounded

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swelling in the upper quadrant. The diagnosis rests between cyst and scirrhus. In favour of its being cyst is the fact that it is very fairly movable, there is no retraction of nipple, the glands are scarcely enlarged at all, there is no pain, and a scirrhus would hardly grow so large in a short time. We will puncture it to make the diagnosis certain (this was done, and it was found to be a cyst). Having emptied the cyst, we will now inject two or three drops of pure carbolic acid into the cyst. This is a very good way of treating single cysts in the breast, and even if fresh cysts form, they can generally be got rid of in the same manner. When, however, there are many cysts in the breast, it is commonly best to remove the affected part or the whole of the breast, as they are a constant source of trouble to the patient.

Tuberculous Peritonitis.

Here is a boy, aged ten, who comes with an affection of the abdomen. He has been in bed five or six weeks, on account of pain and swelling in the abdomen. His father died three years ago of rheumatism; the mother is alive and well, except that she has neuralgia. The boy has had no illness except measles. Three weeks prior to 25th January the patient noticed a swelling in the abdomen, accompanied by pain, which lasted two or three days. Five weeks ago he entered an infirmary. Very slight crackling can be heard over the second right interspace; the right side of the chest at the back is somewhat dull on percussion. The urine is slightly acid, no albumen, no sugar; specific gravity 1020. Singularly his temperature has dropped to the normal since he has been in the hospital. His abdomen is swollen, and a large irregular mass can be felt occupying the lower part; it is very elastic, but the abdomen is not particularly tender. I should describe this abdomen as "lumpy." I think it is very likely to be tuberculous peritonitis. We put him upon one-grain iodoform pills three times a day, and are using iodoform inunction to the abdomen. His condition, however, does not improve, and I think it will be well to open his abdomen. You probably know that the mere opening of the abdomen in these cases does good, and it is quite impossible to prophesy which will be benefited, and which not. About sixteen months ago I opened the abdomen of a child in the Paddington Green Children's Hospital, suffering from tuberculous peritonitis and intestinal obstruction, and found the intestines matted together everywhere, the bowel kinked, and its lumen obstructed by a mass which was ulcerating. I anastomosed the intestine above and below the kink, but I did not expect the child to recover. On Friday last, however, I was surprised to hear that the child was perfectly well, and is now quite fat, and free from all signs of his previous disease. It is a remarkable thing, and I do not know what is the explanation of this great improvement in these cases from the mere opening of the abdomen. Probably in this case the masses which can be felt in the abdomen are masses of tuberculous omentum rolled up to that side. Some of them may be pieces of bowel matted together. [The abdomen was opened, no fluid was present, but many adhesions and enlarged glands. Marked improvement has followed.—March 18th].

Disease of the Lower End of the Ulna.

This youth ten weeks ago met with a slight accident to his wrist, which was followed by an abscess, which was opened five or six days afterwards, and it has remained open ever since. The swelling has gone down, and it leaves him with some enlargement of the lower end of the ulna. A probe goes into a cavity in the interior of the bone. I do not find any actual sequestrum. Is it an acute condition due to pyogenic organisms, or is it tuberculosis? It is in the situation often favoured by tubercle, and if it were not for the acute history I should think it might be that. The condition looks somewhat like strumous dactylitis. I think the proper treatment is to enlarge the opening into the cavity, and scrape it out.

Gummata Around the Knee.

This man æt. 32, comes, as you see, with an ulcerated and swollen knee, the area affected being very large, and extending back to the popliteal space. The history dates back two years, and a fresh sore broke out three weeks ago. Although the knee is fairly fixed, he walks about without any pain, and can carry out movement through a considerable angle. He denies the slightest possibility of anything specific. There are quite a number of ulcers, for the most round and punched out, but some of the older ones are

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serpiginous. There is no undermining of the skin, and no general thickening of the synovial membrane. The case is clearly one of syphilitic gummata in the tissues around the knee-joint. If it were a tuberculous condition around the knee-joint, which had lasted so long, and had been followed by suppuration, the patient could not walk, and there would be an obstruction of the whole of its movements. Although he denies syphilis, we must, I think, look on the case as one of acquired syphilis. He admits several attacks of gonorrhœa, and very probably he may have had at one time a urethral chancre, followed by very slight secondary symptoms. We shall, of course, put him on large doses of iodide of potassium. At thirty-two I do not think we can attribute the condition to his parents. He has been married seven years, and has three healthy children.

CLINICAL LECTURES

ON THE

DIFFERENTIAL DIAGNOSIS AND PROGNOSIS OF INFECTIOUS FEVERS.

Delivered at the Medical Graduates' College and Polyclinic, February 18th, 1901,

By F. FOORD CAIGER, M.D., F.R.C.P.
Medical Superintendent South-Western Fever Hospital, Stockwell.

LECTURE III.

GENTLEMEN,—On the last occasion I concluded my remarks by briefly referring to certain febrile affections which are apt to be mistaken for enteric fever, mainly on account of the indefiniteness of the symptoms, particularly during the early stage. There yet remains to add another group of four diseases which are not infrequently mistaken for enteric, mainly on account of their showing definite signs of inflammation within the abdomen. We can prove that these diseases are frequently mistaken for enteric if we look up the records of the Asylums Board Hospitals.

During the year 1899, out of 1857 certified cases of enteric fever, in 322, or 17 per cent., the diagnosis was held to be incorrect, and of these 322, pneumonia heads the list with 74 instances, influenza comes next with 25, meningitis 18, tuberculosis 15, malignant endocarditis 6. And to these must be added typhus, because in the old days, when that disease was admitted into the hospitals, the mistake was more common in connection with typhus than with anything else. In the second group, where there was some inflammatory condition within the abdomen, in thirty-six instances it was enteritis, that is, using the term enteritis in a fairly liberal sense, so as to include diarrhœa for which no other explanation was forthcoming; of peritonitis there were 11 cases, some of these being tubercular; appendicitis, 7; and ulcerative colitis, 6. That makes, therefore, two groups of separate affections which are likely to be mistaken for enteric, and for two reasons.

It is obvious that the time at our disposal will not permit of our dealing with the individual symptoms of these various diseases, from the point of view of differential diagnosis, so I shall have to content myself with recalling to your memory certain positive indications which point to the diagnosis of enteric, and which, collectively, will not be present in any of these other diseases. First there will be the eruption. The enteric eruption is very distinct, the papules being limited almost invariably to the trunk. It is present in about 70 per cent. of the cases, and nearly all the remaining ones are in children. Some enlargement of the spleen is usually to be determined in enteric. Then there is the Widal reaction, which, if tested according to the precautions I mentioned last time, only fails in about 5 per cent. During the early stage of enteric one is struck by the frequency of bronchial catarrh. That is a point which is never, as far as I can see, sufficiently emphasised in the text-books, but it is a very important sign of enteric.

Lastly, I should mention deafness. Some degree of deafness is extremely common during the first week; in exceptional cases it is due to definite otitis media, while in others it is dependent upon a simple Eustachian catarrh. So we have five symptoms which may be regarded as positive indications of enteric. Enlargement of the spleen is very common, both in acute tuberculosis and in ulcerative endocarditis. Deafness or bronchial catarrh may be present accidentally in various affections, but I think I have fairly expressed the relative value of these symptoms.

In arriving at a differential diagnosis, in addition

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to the clinical indications which I have referred to, we can sometimes obtain confirmatory evidence from what may be called collateral sources. For instance, it is very important to remember those complications which are liable to arise in connection with a particular disease; for instance, the supervention of otitis, or of rheumatism, or of nephritis, after an illness which was supposed to be scarlet fever, is of very great value. In the case of diphtheria there may be cardiac irregularity leading to actual cardiac failure, and post-diphtheritic paralysis. In the case of enteric there will be hæmorrhage from the bowel, perforation, phlebitis, periostitis, pneumonia, and pleurisy. The fact of any of these springing up as complications will constitute a strong confirmation of the original diagnosis.

There are two other diseases which one might mention, so as to make the list of common infectious fevers complete, although it is hardly worth while devoting much time to them, because they are neither of them very likely to be mistaken for anything else, namely, whooping-cough and mumps. In connection with whooping-cough, I should like to mention that very frequently the typical "whoop" is not developed until some ten days or a fortnight after the bronchial catarrh commences. Indeed, in some cases the whoop is never developed at all. But a point which is of distinct value in the diagnosis is the peculiarly energetic character of the cough. The child will be noticed to be coughing extremely energetically, many expiratory efforts following one another very quickly, without, perhaps, any typical whoop at the finish. Should the attack of whooping-cough be interrupted by an attack of scarlet fever, very often the whoop is entirely dropped during the febrile stage. That is a thing which may be noticed particularly frequently in the fever hospitals. A child will be brought to the hospital with scarlet fever, and be said to be also suffering from whooping-cough; but during the first week the child may show no indication of it, yet when the temperature has again returned to the normal there will be heard the typical whoop. The very fact of the patient having taken a fresh cold, or of there being an extension of broncho-pneumonia, is often sufficient to prolong the whoop, and even bring it back again should it have previously ceased. We may therefore get a relapse of the whooping-cough, in consequence of the supervention of some complication.

With regard to mumps, that is not likely to be mistaken for any other distinct affection, but during the course of enteric fever, especially the convalescent stage, it is not infrequent for the parotid gland on the one side to become inflamed, and this non-specific parotitis I have seen occasionally mistaken for specific mumps. In some cases it is not possible to be absolutely sure about it; but the points to rely upon in distinguishing one condition from the other would be that in this inflammatory or symptomatic mumps it is more probable that one side alone will be affected, and that the submaxillary glands will not be involved at all. There is a greater tendency to suppuration, and the affection supervenes during convalescence from enteric fever. By attention to these points it is usually possible to decide that it is not specific mumps. This inflammatory mumps is just as much a complication of enteric fever as cervical lymphadenitis is of scarlet fever.

With regard to prognosis, in estimating the chances of any particular attack proving fatal, one has to remember that the fatality of a disease varies very much in different epidemics, and that it has always been so is a matter of history. In the case of scarlet fever, at the time of Sydenham in this country it was so mild as to have led him to enunciate that oft-quoted dictum, that scarlet fever is hardly deserving of the name of a disease at all. That belief, however, was soon to be contradicted, for during the course of the next century many fatal epidemics of scarlet fever were recorded. Bretonneau, in the course of twenty-three years' practice in the town of Tours, did not meet with a single fatal case of scarlet fever; but in the twenty-fourth year of his practice he had his eyes opened, for he then met with scarlet fever for the first time in a very fatal and malignant form.

The same thing is seen with respect to diphtheria. According to Cedrenus, an ancient monk —who therefore must be believed,—there was on one occasion in Constantinople an epidemic of such fatality that the living were numerically insufficient to bury the dead. We have never experienced anything so bad as that in modern times, although on the Continent the death rate of certain diphtheria epidemics has reached as high as 60 per cent. In this country, until the year

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1895 the hospital mortality from diphtheria was rarely below 30 per cent.; but that was before the days of antitoxin. On the Continent it was usually somewhat higher. In Berlin, at the Children's Hospital, the mortality was over 40 per cent., in Paris 50 to 60 per cent., whereas in London it was 30 per cent.

The same variation is apparent in connection with measles. We never see an outbreak of "black measles" now. No doubt this was hæmorrhagic measles of such intensity that petechiæ occurred in the skin, and bleeding from the mucous membranes, the patient dying of a malignant attack. Probably the hœmorrhagic form was common enough at one time, but we rarely meet with it nowadays. The death rate in different outbreaks of measles may vary enormously. In the Glasgow Fever Hospital during the last thirty years the mortality has varied between 12 and 2 per cent. In the London Fever Hospitals the mortality is nearer 2 than 12 per cent.

Then, in the course of the same epidemic there is often seen a tendency towards variation in virulence. In the case of diphtheria the subject has received a great deal of attention of late years, owing to Thorne Thorne having given prominence to the belief that a virulent outbreak of diphtheria may be developed from what was originally not diphtheria at all; in other words, that a simple non-specific throat affection, by passage through susceptible individuals, may gradually develop an intensity which culminates in a very fatal form of diphtheria. The same thing is true with regard to the epidemic prevalence of typhus. Cholera tells the same story. In this case, however, the mortality tends to fall as the epidemic progresses. In India, as soon as the case mortality falls below 56 per cent. the epidemic may be considered to be on the wane.

Still more interesting to us is the variation of virulence which so often characterises a disease as it affects different individuals, and it is a thing which must be very striking to the general practitioner. It is particularly so, in my own experience, with regard to scarlet fever and diphtheria. Measles seems to maintain the same level of virulence better than scarlet fever or diphtheria; so much so that the infection of measles is regarded as of a more stable character than that of either of the other two diseases. In one striking instance, which I well remember, a certain family were all infected with diphtheria by one of the children, who brought it back from school. Of that family of four persons all died. Another family living three doors off had a child at the same school, and infection was brought to this household from the same source. All of the family except one contracted the disease, but in none of them was the attack severe. There can be no doubt that it is the personal factor which has the greatest influence in determining these variations in severity, and not so much the particular virulence of the infection.

I fear we have only time to speak of scarlet fever, diphtheria, and enteric in connection with the question of prognosis.

With regard to the prognostic indications in scarlet fever, the first thing which strikes one as being important will be the age of the patient. Scarlet fever is much more fatal in young children than in older persons, and the records show that in London during the last few years the mortality under the age of five was over 11 per cent.; between five and ten years of age between 2 and 3 per cent., and after ten years of age somewhere about 1 per cent. or less. Then comes the question of the general health of the patient. Scarlet fever among the poor is a more severe disease than among the well-to-do. We have good evidence of this in the fact that the average severity of the attack in the public fever hospitals has become less and less as years have gone by, owing to the admission of a better class of patient. Originally, that is to say, up to 1887, only paupers were admitted, and in those days the average type of attack was much more severe than it is now. Any dyscrasia, such as the tuberculous or rachitic, has a distinctly bad influence on the type of attack, particularly the tuberculous. I have seen a good many instances in which latent tubercle was lighted up again by an attack of scarlet fever. The attack apparently was going to run an ordinary course, but the temperature remained elevated, and the patient developed pulmonary symptoms. One should always remember this possibility. Scarlet fever arising during the course of any other acute disease is liable to be marked by great severity. Scarlet fever arising during the early puerperium, too, is a condition which gives rise to grave anxiety. I think there is some little misapprehension on

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this point. It is not so much that scarlet fever is necessarily of a bad type in puerperal women, but the scarlatinal process has a great tendency to set up puerperal septicæmia, and in fatal cases what the patient dies of is septicæmia. The mortality in adult women suffering from scarlet fever is normally about 1 per cent.; but in my experience it has been over 50 per cent. during the puerperal state. Therefore puerperal women should be protected from infection at all hazards.

In addition to the question of age and the state of health, our prognosis would be influenced by the type of attack. In other words, should symptoms arise which imply either a septic or toxic type, the prognosis will be correspondingly bad. The septic form of the disease is invariably associated with a condition of ulceration of the fauces, as a result of which, not only is there great local swelling and destruction of tissue, but absorption goes on, and the patient passes into what is practically a condition of septicæmia. Should, therefore, the patient have any degree of infiltration of the fauces and the glandular tissue under the jaw, and with it a profuse muco-purulent discharge from the nose; these symptoms together indicate a septic attack, and, consequently, a serious prognosis. Later on the child, under these circumstances, is likely to develop a septic rash, viz. a morbilliform eruption, which usually occurs during the second week, and in about 80 per cent. of such cases the attack proves fatal. The child wastes rather rapidly, and it is liable to profuse sweating and diarrhœa of a particularly offensive character. Ultimately some further suppurative trouble in connection with one or more of the joints may arise, or, perhaps, an empyema. These symptoms, individually or collectively, will necessarily imply a serious prognosis. Some cases show a distinctly toxic side, and any evidence of toxicity implies a grave prognosis. The signs are—persistent vomiting, extremely high temperature, and very rapid pulse; for instance, a temperature of about 105°, maintained for several days, with a pulse of 160 to 200; and there is also an intense staining rash, and great restlessness, passing into violent delirium or stupor. These symptoms point to toxic intensity, and almost invariably to death. The earliest indications, therefore, are persistence of the initial vomiting with a high temperature, intense and petechial eruption, and great restlessness.

As regards diphtheria, a knowledge of its prognostic indications is in the highest degree important, because, unless you know the disease well, diphtheria is apt to be very deceptive. There are three points concerned in the prognosis which are connected with the patient, and three connected with the attack. First of all there is the age. Diphtheria, like scarlet fever, is a serious disease in young children. Not only do young children stand the diphtheria process badly, but in them it is very apt to take the laryngeal form, which is the most fatal; moreover, they are very difficult both to treat and to feed. As a matter of actual statistics, the death rate under five years of age is about 25 per cent. in the London fever hospitals; between five and ten years of age it is 15 per cent.; after ten years of age it is something like 5 per cent. Then with respect to the state of health. We find that, should the mucous membrane have been previously weakened by inflammation, the diphtherial process tends to spread very rapidly, and take an intense form; consequently a simple catarrh of mouth, throat, or nose, is likely to predispose to severe diphtheria if the bacillus becomes implanted on it. Therefore antecedent scarlet fever, whooping-cough, or measles, conduces to severity of attack. A combination of the infections of measles and diphtheria, before the antitoxin treatment was introduced, was nearly always fatal. The third point attaching to the patient will be the time at which he comes under treatment. That has always been an important factor in the treatment of diphtheria; but with antitoxin it is of paramount importance. This is amply confirmed by statistics, in addition to what we see clinically. Patients brought under treatment by antitoxin on the first day of attack die at the rate of 4·7 per cent.; those who are brought under treatment on the second day, at the rate of 12 per cent.; the third day, 17 per cent.; the fourth day, 22 per cent.; the fifth day, 24 per cent. You see, then, what a very important thing it is that a child should be brought under treatment by antitoxin early in the disease.

Now with regard to the three indications connected with the attack. First of all, there is the locality affected. If the larynx be affected, you have the most serious form of disease, and the mortality is proportionately higher. Next comes the ordinary faucial case without extension; and

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lastly, the mildest, where the disease is limited to the nasal passages. There is a good deal of misconception in respect to nasal diphtheria. Involvement of the nares in a case of faucial diphtheria is a very serious matter; it means that the condition becomes aggravated owing to the extension to the nares of primary faucial disease. Primary nasal diphtheria, on the other hand, in my experience, is not only very mild, but is very liable to be overlooked. Next to be noted is the character of the exudation. We can get very important indications from this. An extensive membrane, that is to say, one involving the tonsils, palate, uvula, and, perhaps, the back of the pharynx, is a very much more serious matter than one limited to the tonsils. And there is not only the extent of the exudation, but its persistence. Should the exudation disappear at the end of three or four days, and be only of limited extent, it is not a very serious matter; but should it persist for a week or more, the prognosis becomes more serious.

The appearance of the membrane itself is also a point to consider in this connection. From its appearance we gain undoubtedly valuable indications. The mildest form of exudation is one which is of a dullish white colour, or it may be yellowish. It is distinctly marginated, with but little, if any, tendency to spread, and it is of a granular or cheesy consistence, so that it can be broken up, and perhaps removed, by a stiff camel's hair brush. As a rule it resolves by itself in a few days. The most serious cases are those which have an exudation which is thick, often gelatinous, and sometimes has a distinctly fibrous appearance. Such exudation may reach a quarter of an inch in thickness in bad cases, and when it separates, it usually does so *en masse*. Before coming away, however, it generally undergoes putrefactive changes, and consequently imparts a bad odour to the breath, which becomes very offensive; and often there is an exudation of blood from the margin of the exudation. Thus the presence of fœtor in a case of diphtheria is a sign of grave import. The last point in connection with the attack is the evidence of any degree of toxæmia, and it is an appearance which may frequently be seen even at an early stage of a bad attack; I mean an appearance characterised by waxy pallor of the skin, and a somewhat sunken condition of the eyes, coupled with a tendency to depression of the circulation and of the pulse, and frequently some hæmorrhagic developments. Hæmorrhage may occur from the margin of the exudation, where it is separating, and by constant oozing blood may run down into the stomach, and thus give rise to hæmatemesis or melæna. There may be bleeding from the nose, the kidneys, the bowel, or from any other mucus surface. I have a case under care at the present time who is bleeding from all those parts, including the conjunctivæ. But, most important of all, there may be hæmorrhage into the tissue of the skin. If the skin shows definite purpuric spots in diphtheria, you may be sure that the patient will die. I have never seen such a case recover; skin hæmorrhages being, in my experience, an absolutely fatal prognostic. It is equally true of smallpox, *bona fide* hæmorrhagic smallpox being also invariably fatal. In many cases, although you may not get an actual purpuric spot, a bruise will develop around the site of an hypodermic injection. This, however, is not of such absolutely fatal significance as is the presence of an actual purpuric spot.

Now these foregoing indications are of the greatest value in the prognosis of diphtheria; so much so, that frequently when a patient has been tided over the acute stage of the attack to the extent that the throat lesion has healed, his appetite has returned, and he presents every appearance of making a satisfactory recovery, one finds one's self in the unfortunate position of having to check the optimism of his friends, by telling them that, in all probability the attack will ultimately prove fatal. It has been my duty to have to do that on but too many occasions, and therefore I can speak feelingly. The way in which such cases die, usually towards the end of the second week, is very distinctive. They die of cardiac failure, and it is therefore highly important to know the indications by which this dread development is attended. The first thing that we notice is that the patient vomits. The vomiting may be simply dependent upon an overtaxed digestion, or it may be due to the administration of a purgative; but, on the other hand, it may be the beginning of the persistent vomiting associated with cardiac failure. Consequently no act of vomiting in a person convalescing from diphtheria should be regarded as unimportant. The patient will become pallid, so much so that his friends will often remark that he looks paler than

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before. You will find that his pulse rate is disproportionate to the temperature. Frequently the temperature will be normal, or even subnormal, at this stage, with a pulse rate of 120, and the pulse frequently is intermittent. That is an indication of the greatest danger. At the same time, with a low temperature the pulse may be only 40 or 50 to the minute. These cases of slow pulse with low temperature are of even worse prognosis than those with a rapid pulse, for they almost always die. The temperature will perhaps be down to 96° and, if the case be going down hill slowly, it will possibly fall below the lowest point which the clinical thermometer is capable of registering. The patient gets restless, often complaining of excessive heat, and tends to throw the bedclothes off, although the extremities may be very cold. The vomiting is persistent, and the patient is unable to retain anything in the stomach, with coldness of the extremities, and of the surface of the body generally. Distressing cramps are frequently complained of, and precordial oppression, coupled with excessive restlessness, but mental clearness is usually retained to the end. The actual end comes very suddenly, life flickering out like a candle. I know of nothing more distressing than the deathbed of one of these cases, in which gradual cardiac failure has supervened during the convalescent stage of diphtheria.

Another way in which diphtheria patients die, although happily, not often, is through paralysis. In most cases of diphtheritic paralysis recovery ensues; but in some the paralysis is of very serious import, and more particularly when the diaphragm is affected in conjunction with some other part. Should the intercostal muscles be paralysed in addition to the diaphragm, the attack is usually fatal. The same may be said if the laryngeal muscles are also involved. The conjunction of respiratory failure and laryngeal paralysis usually tends to bring about death. In some cases you get an association of symptoms which point to the vagus nerve as being affected. These carry a bad prognosis. I refer to cases in which vomiting is associated with aphonia, inability to close the glottis, laryngeal anæsthesia, and difficulty in deglutition, owing to paralysis of the constrictors of the pharynx. The result is that the patient cannot swallow either his food or secretions in a proper way, and their passage into the respiratory channels frequently results in septic broncho-pneumonia. Fortunately, in the large proportion of cases diphtheritic paralysis is of peripheral distribution, and usually ends in complete recovery.

With regard to the prognostic indications in enteric fever, there will be first of all the patient's age. But in the case of enteric it is the converse of diphtheria or scarlet fever, for the mortality amongst older persons is higher than it is in childhood. The mortality in enteric fever patients under ten years of age is not more than 10 per cent.; at ages between twenty and thirty it rises to over 20 per cent.; and at forty years of age it is over 30 per cent. There is, therefore, a gradually ascending mortality with increasing age. The same relation holds good in the case of typhus, but to an even greater extent. Another important matter is the question of physique. It is usually quite impossible to estimate from a person's physical appearance whether he will have a bad attack or not. One sometimes sees the most seedy, unhealthy-looking individual undergoing a very mild attack, which may pass off without leaving any particular bad effect behind it. On the other hand, persons in apparently the most robust health may die from the severity of the attack. If, however, one were called upon to pick out those who would be likely to prove particularly bad subjects for the disease, I should select fat muscular persons, and those who were disposed to gout or renal disease. My experience is that such people stand enteric fever very badly. Then with regard to habits. It is almost a truism to say that a person who drinks is more likely to have a bad attack than one who does not. Intemperance, prolonged mental strain, and overfatigue, are simply a bad prognosis.

Next, as to the symptoms of the disease. First there is the severity of the abdominal condition: violent diarrhœa, accompanied by tenderness of the abdomen, and especially distension, are of evil import. Actual tympanites is a bad sign, and is a source of considerable anxiety. A person whose abdomen is distended usually has difficulty in breathing, and is in constant distress; for since the diaphragm is unable to descend properly, expansion of the lungs is necessarily deficient, and congestion is likely to supervene. Moreover, a distended bowel is more likely to perforate than one which is not distended. There is also con-

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siderable pain; but quite apart from pain, tympanites is always a serious matter.

Next should be mentioned high temperature attended with rapid pulse and a dry tongue. Murchison taught that of cases in which the temperature by the end of the first week reached 104° something like 50 per cent. died. In my experience it has proved very true. A condition of stupor or delirium, in which the mouth is generally kept open, conduces to this dryness of tongue.

Another point is the severity of the nervous symptoms. Should there be much delirium, particularly of a violent character, which tends to exhaust the patient, or much muscular tremor, affecting the tongue in addition to the general muscular system; or should there be undue prostration, as evidenced by sinking in the bed and a loss of control over the evacuations—a condition the signs of which are collectively known as the "typhoid state,"—that means a very bad attack. Lastly, the appearance of one of those most serious complications, particularly pulmonary inflammation or hypostatic congestion, hæmorrhage from the bowels, or perforation, implies that the patient's condition is very serious. Hæmorrhage is fatal in about 15 to 20 per cent. of the cases, while, should perforation occur, the mortality, according to Murchison, is as high as 95 per cent. But here the question will depend upon whether the perforation is treated by modern methods, that is to say, by operation, or whether the patient is to be allowed to take his chance without its being attempted. Murchison's remarks and his figures refer to the days before the operation had ever been seriously undertaken.

I regret that, as my time limit has now been reached, I shall have to omit any reference to treatment. I had intended to devote a proportionate amount of time to this important subject, but the discussion of differential diagnosis took longer than I anticipated.

THE usual conditions which follow unsuccessful operation on varicose veins are—(*a*) Pain in and around the scar; (*b*) general swelling and tenderness of the leg; (*c*) development of varicosities above or below the operation scar, but not at the site of the operation itself.—*Therapeutic Gazette.*

HYPNOTISM MAINLY FROM A PSYCHOLOGICAL STANDPOINT.*

By J. MILNE BRAMWELL, M.B., C.M.

(*Concluded from p.* 390.)

IN addition to automatic writing and post-hypnotic appreciation of time, I wish to refer to an example of spontaneous mental action in hypnosis, as it also is of importance in reference to the theories we shall afterwards discuss.

Spontaneous mental action in hypnosis.—After receiving the suggestion that she should sleep deeply, and be unconscious of external impressions, the subject of the time experiments was sometimes allowed to remain undisturbed for an hour or two in the hypnotic condition while other patients came for treatment. I questioned her in hypnosis as to her mental condition under these circumstances. She stated that she was unable to recall anything that had been said or done by others and that she rarely spontaneously thought of anything herself. She related, however, the following incident:—"One day I was troubled about my dressmaking; my employer was ill, and I had more responsibility than usual. I had a difficult piece of work to do, and could not understand how it was to be done. When asleep here, I planned how I would do it and carried this out successfully when I returned home. When I awoke, I did not know I had done this. The way out of the difficulty suddenly came into my head on my way home, and I thought I had discovered it at that moment in the waking state. I now remember planning while I was asleep what I afterwards carried out."

The therapeutic phenomena of hypnosis.—As my time is limited, and you are more interested in the psychological side of hypnotism, reference to its therapeutics must be extremely short.

Insanity.—From 1880 until his death Voisin devoted himself largely to the treatment of mental disorders by hypnotic suggestion, and claimed to have cured many cases of undoubted insanity. Successful cases are also reported by Répoud, Burckhardt, Liébeault, Brémaud, Velander, etc.

Dipsomania.—Nearly all those engaged in hypnotic work, have reported cases of dipsomania

* A lecture delivered to Dr. Savage's M.D. Students at Bethlem Royal Hospital, November 8th, 1900.

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successfully treated by hypnotism and a considerable proportion of my hypnotic cases have been sufferers from it. In the successful cases, including both sexes, the duration of the disease had varied from five to seventeen years; some had had several attacks of delirium tremens and epilepsy, and in most there was a family history of alcoholism. In more than one instance repeated and prolonged treatment in a retreat had failed. Some of the earlier cases have now remained about twelve years without relapse.

Morphinomania and other drug habits.—Successful cases of morphinism, etc., have been reported from many quarters, the most important series of cases being published by Wetterstrand in 1896.

Vicious and degenerate children.—Hypnotic treatment frequently affords good results in vicious and degenerate children. Some of my successful cases might have been justly classed as morally insane, the patients being addicted to self-abuse, purposeless theft and lying.

Obsessions.—Hypnotic treatment has yielded brilliant results in various forms of obsession, such as agoraphobia, claustrophobia, *folie du doute*, etc.

Hysteria.—Possibly at least half of the hypnotic cases recorded may be classed as hysterical; these range from isolated sensory or motor disturbances to the graver forms of the maladie, *la grande hystérie*, so seldom seen in England. The therapeutic results obtained have been excellent, and thousands of patients, many of whom had been more or less confirmed invalids for years, are now, thanks to hypnotism, leading useful and active lives. Naturally hypnotism, like other methods of treatment, has its failures. In estimating hypnotic results, however, we must not forget that, in this country at all events, the patient has for the most part already undergone careful, varied and prolonged medical treatment, and hypnotism has only been resorted to because everything else has failed.

Dangers.—As far as my experience goes, the employment of hypnotism by medical men who are acquainted with the subject is absolutely devoid of danger. I have seen no unpleasant symptom, even of the most trivial nature, produced by the induction of hypnosis. Further, I have never seen any evil after-effects, either mental or physical; and, if such were likely to occur, surely some of my patients would have presented them. I have hypnotised hundreds of persons of both sexes and of all ages from early childhood upwards, occasionally repeating the process almost daily for months. Some of these were actually insane, while in many the mental condition was far from stable. In a considerable proportion recovery took place after hypnotic treatment, and many years have passed without relapse.

This view as to the alleged dangers of hypnotism is largely shared by others. For example, Professor Forel says: "Liébeault, Bernheim, Wetterstrand, van Eeden, de Jong, Moll, I myself, and the other followers of the Nancy school, declare categorically that, although we have seen many thousands of hypnotised persons, we have never observed a single case of mental or bodily harm caused by hypnosis; but, on the contrary, have seen many cases of illness relieved or cured by it."

General Summary.—Before discussing theories, I will summarise the characteristics of the hypnotic state: In hypnosis, while the subject loses none of the attributes of his normal condition, he has acquired new and varied powers, and a control over his own mind and body without parallel in waking life. He can alter the rhythm of his pulse, control his secretions and excretions and increase or arrest the activity of his special senses. He can induce anæsthesia or analgesia, recall memories lost to waking life and obliterate others and, even when all the phenomena are elicited by the suggestions of the operator who has hypnotised him, maintain consciousness and volition unimpaired. From the therapeutic side, he can obtain relief from the pain of disease or injury, procure sleep at will and for as long or as short a time as he wishes. He can escape from obsessions, conquer the diseased craving for alcohol or narcotics and get rid of numerous functional disturbances. Finally, he can be taught to hypnotise himself, and from henceforth—free from all external interference—can by self-suggestion produce phenomena identical with those just described. All these phenomena cannot be evoked in every case, but something can always be effected beyond the power of the waking will.

Hypnotic Theories.

(*a*) *Mesmeric.*—According to Elliotson, Esdaile, and the later mesmerists, the phenomena of mes-

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merism were due to a peculiar vital force or fluid possessed by the operator, and transmitted by him to the subject. This force also existed in magnets and in certain metals and crystals, and they, like the operator, had the power of exciting the phenomena. All subjects were not susceptible to these influences, those who were being called "Sensitives."

(*b*) *Braid's theories.* — The cardinal point in Braid's theories was a recognition of the subjective origin of all so-called mesmeric phenomena. He demonstrated that these arose from changes in the subject's own brain and nervous system, and were entirely independent of any mystic force or fluid possessed by the operator, or by inanimate objects. He showed that powerful magnets, when brought close to sensitive subjects who were ignorant of their presence, produced no results. On the other hand, he succeeded in exciting mesmeric phenomena, when he made the subjects believe that fictitious magnets were real ones.

Braid substituted the term hypnotism for that of mesmerism, and invented the terminology we now use.

At one time Braid thought the phenomena were to be explained by involuntary concentration and dominant ideas, and this view was adopted and published by John Hughes Bennett in 1851. According to the latter, hypnosis was characterised physiologically by alterations in the functional activity of the nerve-tubes of the cerebral lobes. A certain proportion of these became paralysed through continued monotonous stimulation; while the action of others was consequently exalted. As these tubes connected the cerebral ganglion cells, suspension of their function interrupted communication between them.

From the psychical side Bennett explained the phenomena by the action of predominant and unchecked ideas. These obtained prominence because other ideas, which under ordinary circumstances would have controlled their development, did not arise, as the portion of the brain with which they were associated had its action temporarily suspended, *i. e.* the connection between the ganglion cells was broken, owing to the interrupted connection between the fibres of association. Thus, he said, the remembrance of a sensation can always be called up by the brain, but, under ordinary circumstances, from the exercise of judgment, comparison and other mental faculties, we know it is only a remembrance. When these faculties are exhausted the suggested idea predominates and the individual believes in its reality.

The theory just cited is worthy of special note, for it has been reproduced in whole or in part, and invariably without acknowledgment, by the great majority of those who have attempted a scientific explanation of hypnotism.

Later, Braid entirely abandoned the theory of concentration of attention and monoideism. More extended observation led him to conclude that the attention could be directed to many points simultaneously during hypnosis, and that volition, general consciousness and intelligence were unaltered. He also recognised the alternating memories of hypnosis, and described the condition as one of double consciousness. These views he promised to publish more fully, but died before accomplishing the task.

Until I gave an account of them a few years ago, Braid's later views had been apparently almost entirely forgotten, and had certainly exercised no influence on hypnotic thought.

(*c*) *The theories of Charcot, or the Salpêtrière School.*—In the assertions of the Salpêtrière School in reference to the influence of metals, magnets, etc., we have an exact counterpart of the controversy between Braid and the mesmerists. All the old errors, the result of ignoring mental influences, are once more revived. Liébeault and his followers successfully demonstrated the fallacious nature of the Salpêtrière theories, and these are now practically ignored by scientific men. Had Braid's work been better known, it is difficult to conceive how the Saltpêtrière errors could have arisen, for many of their experiments, such, for instance, as those with drugs in sealed tubes, were well-known mesmeric ones, which had been thoroughly exploded by Braid.

Putting aside the Salpêtrière theory as unworthy of serious attention, the remainder may be grouped under three heads (1) Physiological inhibitory theories. (2) Psychological inhibitory theories. (3) The subliminal or secondary consciousness theory.

(1) *Physiological inhibitory theories.*—Of these Heidenhain's may be taken as a type. According to him, the phenomena of hypnotism were due to the arrested activity of the ganglion cells of the

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cerebral cortex. The higher centres were inhibited by the monotonous stimulation of other nerves, and sensory impressions, which usually produced movements after passing to the higher centres and evoking consciousness, now did so by passing directly to the motor centres. This was essentially a "short circuiting of nervous currents" theory. Heidenhain regarded the hypnotised subject as a pure automaton, who imitated movements made before him, but who was entirely unconscious of what he was doing. Heidenhain held that the fact of the hypnotised subject's forgetfulness of the sensations he had experienced during hypnosis afforded satisfactory evidence that these sensations were unconscious ones.

This theory is not in accordance with observed facts. The objections to it are too numerous to be cited in detail, but the following are the most important:

(*a*) Instead of a hypnotised subject imitating a movement which he sees, and failing to perform one which is verbally suggested to him, the reverse is actually the case. As a rule the slightest verbal suggestion is sufficient to induce the movements described by Heidenhain; on the other hand, hypnotised subjects never copy movements made before them unless they have been trained to do so. The imitative movements only take place when the hypnotic subject is conscious of them and knows that he is intended to make them.

(*b*) Heidenhain's only argument is based upon the subject's subsequent defective memory; he thus assumes as his sole test for present consciousness, the subsequent remembrance of its content. This, of course, is absurd. There is, however, a more radical objection to all arguments founded on loss of memory—the fact, namely, that memory is frequently present. Braid, for example, found that only some 10 per cent. of his subjects were unable to recall the events of hypnosis, while Schrenck-Notzing's International Statistics of 8705 cases gives 15 per cent. Again, if on waking the act performed during hypnosis is forgotten, the lost memory can be revived in subsequent hypnoses; and, finally, the amnesia which would otherwise follow deep hypnosis can be entirely prevented by suggestion.

2. *Psychological inhibitory theories.* — In hypnosis, according to Bernheim, the whole nervous force of the subject is concentrated upon a single idea. This nervous concentration may be changed from one point to another in response to the suggestions of the operator, but, though the focus shifts its place, the same concentration continues to exist.

In the normal state, he says, we are subject to errors, illusions, and hallucinations, but still these are likely to be questioned and corrected by the action of the other senses. In the hypnotised subject, on the other hand, there exists a peculiar aptitude for transforming a suggested idea into an act. This is so quickly accomplished that the intellectual inhibition has not time to prevent it, and when it comes into play it does so too late, as the idea has been translated into its physical equivalent. If consciousness follows the suggested act, it at all events follows it too late to interfere with its fulfilment.

Just as Heidenhain's theory was practically a reproduction of the physical side of Bennett's, in like manner Bernheim reproduces its psychical side.

The essential point in both these theories is the supposed arrested action of the higher cerebral centres, and, in consequence, the more or less complete automatism of the hypnotised subject.

In some recent theories claiming originality the physiological half of Bennett's masquerades in modern terminology. Thus, instead of "association fibres" we have "neurons" and "neuronic groups;" "dendrons" contract and break the contact between nerve-cells, while a supposed decrease in cerebral activity is explained by an "inhibition of the amœboid movements in the pseudopodic protoplasmic prolongations of the neurospongium."

The principal objection to these inhibitory theories is the fact that they are based upon a misconception of the mental conditions existing in hypnosis. It is true that the hypnotised subject, like the normal one, can be trained to perform automatic acts, but the hypnotic life, as a whole, is much more conscious and less automatic than the normal one. The phenomena which particularly demand explanation are the increased memory, volition, intelligence, etc., which we find in hypnosis, and theories, no matter how elaborate, nor how learned in terminology, are valueless when founded upon imaginary mental states, the existence of which is simply assumed by the operator.

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The subliminal consciousness theory.—This theory, instead of explaining hypnotism by the arrested action of some of the brain centres which subserve normal life, attempts to do so through the arousing of certain powers over which we normally have little or no control. The principle on which it depends is largely admitted by science. William James, for example, says, "In certain persons, at least, the total possible consciousness may be split into parts which co-exist, but mutually ignore each other."

The stream of consciousness in which we habitually live is not our only one. Possibly our habitual consciousness may be a mere selection from a multitude of thoughts and sensations, some at least equally conscious with those we empirically know. The waking life is remembered in hypnosis, but the events which occur during profound hypnosis are forgotten in the waking state; this destroys any claim of the primary to be the sole memory. The self below the threshold of ordinary consciousness Myers termed the "subliminal consciousness," and the empirical self of common experience the "supraliminal." He held that to the subliminal consciousness and memory a far wider range, both of physiological and psychical activity, is open than to the supraliminal. The subliminal or hypnotic self can exercise over the nervous, vaso-motor and circulatory systems a degree of control unparalleled in waking life.

The facts in support of the existence of a secondary consciousness may be grouped under three heads, viz. :—(*a*) Those occurring in hypnotic life; (*b*) those observed in ordinary life; and (*c*) those associated with morbid states.

(*a*) *Hypnotic phenomena which apparently support the theory of a secondary consciousness.*—These are too numerous to be referred to in detail, and it might even be claimed that every deeply-hypnotised subject shows evidence—in memory changes alone—of the existence of a secondary consciousness.

The solution of the dressmaking problem during hypnosis, already referred to, and its passage at a later date into the primary consciousness, is an interesting example of double consciousness. Finally, in the phenomena of automatic writing, there is evidence which shows not only that there is a secondary consciousness which alternates with the primary one, but also that the two may act simultaneously and independently of each other.

(*b*) *Facts in support of a secondary consciousness drawn from normal waking or sleeping life.*—Here the evidence is not so clear as in the preceding section; but without the hypothesis of the secondary consciousness it is difficult to explain phenomena such as the following:

1. The recollection of forgotten facts without the association of ideas connected with normal memory. Every one, I think, must recall instances in which he has tried to remember a forgotten name and, after having failed to recall it by every device imaginable, at last put the problem on one side in disgust and turned his attention to other things. Later the forgotten name rises into consciousness with a suddenness which is startling, and no association of ideas can be discovered to account for its appearance.

2. Literary problems which are vainly struggled with when awake are sometimes apparently solved in sleep. Thus, on awaking, page after page is easily satisfactorily written, while the day before the author had been unable to find expression for his thoughts.

3. According to Myers, works of genius, instead of being the result of an infinite capacity of taking trouble, were due to the intelligent action of a secondary consciousness. The labour was performed in a subterranean workshop, as it were, and then presented in completed form to the normal consciousness. The latter not only believed that it had done the work itself, but thought that this had been performed instantaneously.

(*c*) *Facts in support of a secondary consciousness associated with morbid states.*—Many interesting and well-authenticated examples of this group have been recorded. The most important is that of Félida X, reported by the late Dr. Azam of Bordeaux. Félida, who was a miserable, querulous, hysterical invalid, suddenly began to have short attacks of profound stupor, from which she apparently spontaneously awoke, but in reality passed into a condition of secondary consciousness. This lasted for an hour or two, then, after a short period of renewed unconsciousness, she passed again into her ordinary state. The secondary state was superior, both intellectually and physically, to the primary one. In it she was gay, active, and intelligent, and remembered not only all the events

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which had taken place in former attacks of secondary consciousness, but also those of normal life. The ordinary self, however, knew nothing of what had taken place during the secondary condition. As time went on the secondary attacks became more frequent and prolonged and, after thirty years, occupied almost her entire life, while the periods of unconsciousness, which had formerly preceded and followed them, became so short and slight as to be hardly recognisable. Towards the end of this time, it was found that what Félida called her "attacks" were simply her short and rare lapses from her secondary consciousness into her original primary one. These returns to her original state distressed her greatly, as they were characterised by complete loss of memory as to all the events of the secondary life, which now almost entirely filled her existence.

According to Gurney, when the hypnotised subject was given a post-hypnotic time-appreciation problem, his secondary self calculated when this would fall due, and then watched the passage of time just as the primary self might have done. When the exact moment arrived, there was an uprush from the primary to the secondary consciousness and the suggestion was accurately carried out.

This theory does not satisfactorily explain the experiments I have already recounted to you. My subject, when questioned in subsequent hypnoses, could recall neither calculations nor time watchings, and, if these had taken place, they would undoubtedly have been found in her hypnotic memory. Further, when she was made to calculate in hypnosis when the suggestions would fall due, her results at first were usually erroneous. Despite this the experiments were carried out correctly and, again, the secondary consciousness knew nothing as to the means by which the results had been obtained. Are we to suppose, then, that a third consciousness or substratum of the personality existed, and that the execution of the suggestion was due to its intelligent action?

As the secondary self is often intellectually superior to the primary one, though we don't know why, we might be inclined to admit, although equally without reason for it, that the third self transcends the second one. As all the selves inhabit one body, and as the secondary and tertiary ones have presumably access to all the information which reaches the primary, are we to suppose that they have proved the apter scholars? It seems more than fanciful to imagine that, while the schoolboy's ordinary self was learning his lessons, a second boy was peering over his shoulder, as it were, and doing the work still better. What must we say, however, of a third boy, learning along with Nos. 1 and 2, and surpassing both of them? Yet the real arithmetical problems involved, in the time-appreciation case referred to, were quite beyond the subject's normal powers, while her secondary self made many errors in reference to them and her third self invariably solved them correctly.

Time does not permit reference to other cases which apparently involved a third, as well as a secondary, self or personality. Amongst the most interesting and important of these is the one recorded by Dr. Morton Prince in "An Experimental Study of Visions" ('Brain,' 1898).

In reference to my time-appreciation case, with its strange problems of mistaken arithmetical calculations during hypnosis and the carrying out of subsequent acts involving correct calculation, Professor William James writes, "I agree entirely with you, that a 'third self' must be involved, but what such a third self in its totality may signify I have not the least idea." According to him, these manifestations of the "hidden self" are immensely complex and fluctuating things, which we have hardly begun to understand and concerning which sweeping generalisation is sure to be premature. Meanwhile, he adds, a comparative study of subconscious states is of the most urgent importance for the comprehension of our nature.

CHERON ('Rev. med. chi. des Mal des femmes,' November 25th and December 23rd, 1896) attests to the value of thyroid extract in threatened abortion with hæmorrhage, and in preventing the arrest of uterine involution after childbirth. He considers it a valuable galactagogue, stimulating the mammary secretion while it lessens the functional activity of the uterus. Jouvin has referred to the remarkable shrinkage of a fibroid while treating for obesity a patient who had a uterine fibroid. Leith, Napier, Polk and Shober have also reported similar results along the same line.—*American Gynæcological and Obstetrical Journal*, March, 1901.

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